The Builder.

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ILLUSTRATIONS.

Houses, 190 and 191, Queen's Gate, South Kensington.—Mr. F. G. Knight, Architect ..... *Double-Page Photo-Litho.*
East Window, Leigh Church, near Manchester.—Executed by Messrs. Shrigley & Hunt ..... *Double-Page Ink-Photo.*
Design for a Free Library for a County Town.—By Mr. Arthur Bartlett ..... *Double-Page Ink-Photo*
House at Wokingham.—Mr. Ernest Newton, Architect ..... *Single-Page Photo-Litho.*
Design for a Painter's House and Studio, by Mr. F. M. Simpson, Architect ..... *Single-Page Photo-Litho.*

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The Electrical Exhibition at Sydenham.

ON Saturday last the Lord Mayor and Lady Mayoress visited the Crystal Palace. This second opening of the Exhibition has had the effect of stimulating the efforts of exhibitors, and many of the stalls which have hitherto remained almost empty since the first opening in January are now fairly complete. In exhibitions of this class the readiness of manufacturers to advertise their wares is made use of to instruct the public, and with this latter aim the catalogue has been drawn up.

The exhibits are divided into sections,—"Phenomena and Laws of Electricity," "Electrical Measurements," "Batteries," "Motors," &c.,—seventeen sections in all; with two or three pages of what, after revision, may be accurate popular explanation, as a preface to each section. The idea is a good one could the Exhibition be arranged on the same plan, but that is obviously impossible; no exhibitor could be expected to distribute his goods over a dozen stalls, where they would be mixed with those of some fifty other firms; consequently, to follow out the catalogue plan, one would have to go through the Exhibition seventeen times,—an appalling prospect.

From this general scheme the Government exhibits of telegraphic instruments is exempted. Here we have chronologically-arranged specimens of the principal apparatus used from 1837, down to the present day.

Amongst them is a delightful placard of 1837, announcing the opening of the first telegraphic office, and engaging to send messages "with most confiding secrecy" at a shilling each. From this placard it appears that people were willing then to pay a shilling to see the telegraph in operation (as we should now to see, or hear, a phonograph).

Those were the ages of faith. No one then doubted the material existence of electricity, and the very rate at which the "fluid" travels is given.

The Postal Telegraph Department, moreover, not only arranges the exhibits well, but gives a concise but intelligible account of what Clerk Maxwell, as a boy, used to call the "go of it" in the majority of cases.

Leaving the Government stall we come at once to Mr. James White's exhibit of Sir William Thomson's measuring instruments, including current meters which will measure any current from the hundredth of an ampere to a thousand amperes, watt meters, an improved rheostat, and the exquisitely delicate siphon recorder for submarine telegraphy.

On the right is an interesting exhibit of the Maquay Electric Light Syndicate of portable lamps, driven by primary batteries, in which the tiny filament is raised to a very high degree of incandescence.

One of these lamps is burning under water, showing that it may be used as a diver's lamp; with this we may contrast the Mining and General Electric Lamp Company's hand-lamps on the opposite side of the Nave, which are driven by lithanode cells and have a switch connected with resistances so that the brightness of the light may be varied.

A recess between the Mediæval and Renaissance Courts has been appropriately fitted up by Messrs. Benham & Froud as the chancel of a church electrically lighted. The advantages of the electric light in church are as obvious as in the theatre, but we fear it will make its way there slowly; wax candles on the altar are likely to survive for reasons of ritual long after they cease to be used elsewhere, as a *stone* sacrificial knife existed long after the Stone Age.

The stand of the Consolidated Telephone Company, No. 7, and No. 104, that of the National Telephone Company, will be attractive to all who are interested,—and who is not?—in this marvellous application of electricity to the service of man. Here will be found numerous compact and beautifully-finished instruments, receivers, and transmitters, including the pretty little watch receiver. The National Telephone Company also exhibits a multiple switchboard, so that visitors can form an idea of what takes place daily in a Central Exchange. Its instruments are in communication with London, Manchester, Liverpool, and other towns, not only illustrating the great advance of late in long-distance telephoning, but giving its customers an opportunity in the Music-room, No. 191, of, in effect, attending various London and provincial theatres.

For those who live far from a Central Lighting Station, who prefer additional cost of up-keep to heavy initial expense, and who consider that the constant re-charging of primary cells is less troublesome than the occasional attention required by a gas or petroleum engine, the Weymersch Battery Syndicate, Stand 113, provide primary batteries which claim a high degree of constancy for many hours.

Messrs. Rashleigh, Phipps, & Dawson have a prettily-arranged stall in the North Nave, with all the latest improvements in electric fittings, and some quaint and fanciful allegorical designs; they also light and contribute part of the decorations to some rooms in the South Gallery, artistically furnished by Messrs. Godfrey Giles & Co.; they use, with good results, translucent plates of ivory to soften the light, or bead ray-diffusers to distribute it effectually over a room. The electrical effects introduced into the Pantomime are also arranged by this firm.

In the south nave the most conspicuous object is an electric crane shown by Messrs. Crompton & Co., and near it the search light exhibited by the same firm flashes its rays on the fountain which is playing close by. They also exhibit a four-pole machine capable of supplying over 8,000 lamps, besides other dynamos, some specially designed to give heavy currents for electric plating or for the new process of electric welding. A completely-furnished municipal testing laboratory for testing meters and for faults in insulation should attract the attention of County Councillors, actual or potential, as also should their model of the system of mains; while builders and architects will be interested in the ornamental mouldings, picture-rails, cornices, &c., designed for carrying and concealing the house wires. Of more technical interest are their twisted armature bars to reduce Foucault currents, their cut-outs and heavy discharge switches.

The beautifully-furnished show-rooms in the Western Gallery, decorated by Messrs. Wallace & Co., are also lighted by Messrs. Crompton & Co.

Messrs. Swinburne & Co.'s stand will be one of the most remarkable in the Exhibition when their transformer, giving 0·2 ampère and 100,000 volts, can be seen regularly in action. It has been working for some time at Teddington, where it sparks a distance of 6 in. in air, establishing an arc which can be drawn out to almost any length, and sends a current through substances hitherto regarded as amongst the best insulators, heating them as currents of ordinary voltage do conductors. There is, of course, a display of "hedgehog" transformers, with their accompanying condensers, so valuable in conjunction with open circuit converters.

Considerable interest will be taken in the General Electric Company's (No. 7, south nave) exhibition of apparatus for heating and cooking by electricity. Though it is admitted that the production of heat by electrical means is expensive, yet for some purposes this disadvantage is more than compensated for by the economy in its use, the heat being obtained exactly where, and only while, it is wanted. In most of these appliances the resistances which can be heated by an electric current are embedded in enamel. The electric cigar lighter has a platinum wire coil embedded in asbestos, which is raised to incandescence by the current, and would certainly be useful in a house where reliance on the electric light has made people careless in the supply of matches. The lady, too, whose dismay at finding her room lighted by electricity and warmed by hot-water pipes Mr. Du Maurier has lately depicted in *Punch*, should present her hostess with a pair of electric hair curlers, so should modern science remedy the "disadvantages of modern science." We question, however, whether electrically-heated foot-warmers have any future before them. The expense here is a fatal objection; one does not want a foot-warmer for five seconds or for five minutes only. At this stall also may be seen an improved automatic cut-out, and ampère-meters and voltmeters on Donnison's system.

The most remarkable of Messrs. Woodhouse & Rawson's exhibits is the "Kingdon" alternator, in which, as in a transformer, the coils of both field-magnets and armature are stationary; the current is produced by the revolution of inductor blocks, which thus vary the induction in the armature. The mechanical advantages of having the moving parts of iron only are obvious, and the clearance can be made very small.

Messrs. Siemens Brothers contribute, besides the usual measuring instruments, batteries, &c., a carbon contact switch for heavy currents, a model of the cable steamer *Faraday*, and an apparatus for illustrating the curves formed by the vibrations of the diaphragm of a telephone. Their most sensational exhibit, however, is the 52,000 volt-transformer; but this will have to take a second place when Messrs. Swinburne & Co.'s 100,000 volter is at work.

The Brush Electrical Engineering Company exhibit an electrical tramcar which is so placed that it is impossible to see anything of the motor which should drive it,—tramcars can be seen without visiting Sydenham. They have also a number of the well-known Brush machines of various sizes, several of which are of the old discarded pattern with channelled instead of laminated armature cores. Two or three Mordey alternators are also shown, one of which is apparently taken to pieces the better to show the construction; we say *apparently*, for the parts of this machine never were, or could be, put together,—the armature belongs to a much smaller machine than the field magnets; we find from the catalogue that this is not due to an oversight, as we at first imagined, but that the firm have deliberately chosen to exhibit different parts of two machines, the out-put of one being half as much again as the other; but the purpose of this arrangement remains a mystery.

For the system of concentric wiring shown by Messrs. Andrews & Co., Stand No. 162, it is claimed that the leads and house wires occupy less space, that wood casing is unnecessary, and that joints can be made with less skilled labour than on the ordinary plan. On the other hand, it seems that a fault is more difficult to find, or, when found, to remedy. The advantage of a short circuit, and fuses going, whenever there is the slightest fault, will hardly be so clear to others as it is to Messrs. Andrews, but the saving of space is a real gain, and if the wires can be run, and bent round corners, without bringing the inner wire into contact with the outer, there may be some field for this system.

The specialty of Messrs. Frank Suter & Co., No. 154, North Nave, is their appliance for picture lighting by means of reflectors, so that the direct glare of the lamps may not dazzle the eyes of the spectator; but their prettiest exhibit is a little glow-lamp of frosted glass shaped like the flame of a candle and mounted on a candle-like support; at a short distance these lamps may easily be mistaken for very bright and steady candles.

In the machine-room, where the dynamos are at work, the great improvement in dynamo design since the exhibition of 1881, or even since the South Kensington Exhibition of 1885, strikes even a casual observer.

The modern machine is much more compact, makes less noise, and has a far greater output; the sparking at the brushes is imperceptible (except in one Brush, and, of course, the Thomson-Houston machines); many of the machines are direct-driven, saving the waste of space and energy implied by the older belt and pulley method. The number of gas-engines used is also a prominent feature of this exhibition, and it is noteworthy that here they work almost in silence, which they can seldom be persuaded to do in any private installation. The absence of belts and shafting noticeable throughout the Palace, and not merely in the machine-room, is a striking illustration of the advance made in the electrical transmission of power; nearly all the machinery in motion which is not driven directly by an engine being actuated by an electric motor.

Visitors to the Frankfort Exhibition were attracted to the Thomson-Houston machine by the blaze of the commutator sparking, due to the spherical armature being wound in three sections only, and the curious crackling noise as it is blown out by the air blast. The makers apparently do not care for this sort of advertisement, for in the present exhibition the commutator is turned away from the spectators and the noise lost in the general hum of the machinery.

The South Gallery is chiefly given up to examples of domestic lighting to which we have already referred, and to medical batteries and belts, of which the less said the better. The Consolidated Telephone Company have here a supplementary stand, but at several of the stalls the exhibits are only indirectly electrical, as No. 221 N., Cash & Co.'s exhibit of bleached shellac varnishes, &c.; Wake & Sanders's mica exhibition at 206 A.; and (No. 227) Britannia Rubber and Kamptulicon Company.

The exhibit of Messrs. Johnson & Phillips, though conspicuous, is not at first sight obviously connected with electricity. The prominent objects on their stand, No. 10, South Gallery, are some large buoys and grapnels, which are used in laying and picking up cables. Less easily seen are a set of linesman's tools, and specimens of switches, resistances, &c. They also show D.P. accumulator cells designed to bear a high rate of discharge without injury to the plates.

In the Machine Room, No. 60, this firm also exhibits a number of Mr. Kapp's dynamos, both direct and alternating, including a large eight-pole dynamo of 130 kilowatts output, coupled with a Davey-Paxman triple expansion engine. Mr. Kapp, who in the earlier days of electrical engineering had much to do with the designing of Messrs. Crompton's dynamos, claims for his own a very high efficiency, due to the care with which the proportions have been worked out beforehand.

The steam and gas engines in the machine-room, though indispensable for the production of the electric light, can scarcely be regarded as themselves part of an "electrical" exhibition, and we may be pardoned if we pass them by with a mere nod of recognition. Even less claim to the title of electrical has the stand of Messrs. Chubb & Son, where safes and locks are shown on the strength of the addition of an electrical alarm. Similarly a diver's dress is displayed by Mr. Applegarth, with the addition of an electric lamp in the helmet; but all these have a better claim than the Homacoustic Speaking Tube Company, who introduce their speaking tubes, by adding to them an electric bell call.

To sum up, the general effect of the exhibition, especially at night, is very good. The blaze of light from the stands, softened and freed from glare by every kind of shade and screen, contrasts well with the harsher white light of the arc lamps, which, burning with a steadiness unhoped for ten years back, and hung too high to clash with the milder glow lamps, illuminate the rest of the Palace. There is every reason, in spite of the absence of many important firms, to expect the exhibition to be a success. The Palace Company and the exhibitors mutually assist each other, the former supplying a roof and appropriate surroundings, and a certain number of habitual visitors; the latter decorating and beautifying the Palace, and attracting many visitors who would otherwise never think of going down to Sydenham.

Amongst the firms who do not seem to appreciate the advantages offered them may be mentioned Messrs. Mather & Platt, Paterson & Cooper, Latimer, Clark, Muirhead, & Co., Goolden, Parsons, and Ferranti & Co., but we understand on good authority that the last-named firm has, though late, repented of its determination, and we may expect to find it in the next edition of the catalogue.

NOTES.

REFERENCE has been made once or twice in our columns to the large and highly-finished model of the Parthenon, constructed in Paris a year or two ago under the direction of M. Chipiez, and which has since been purchased for and erected in an Art Muesum in New York. The model itself we have not had the opportunity of seeing, but from the fine set of photographs of it which have been taken in New York we fear that the American institution which has purchased it has obtained a representation or restoration of the celebrated temple which is in some important points very far from accuracy. In the first place, M. Chipiez has chosen to insert seated winged sphinxes at the bases of the pediment, and a very large acroterion, flanked by winged genii, at the apex. The sphinxes, or something of the kind, may be probable, though there is no authority for them; the acroterion and its figures in some sort also, but the genii are represented as apparently silver figures, or burnished metal of some kind, and in this respect and in their attitude have a somewhat tinsel and Parisian appearance. A more important point, which is demonstrably wrong, is that the entasis of the columns is greatly exaggerated. The actual deflection from the straight line in the columns amounts roughly to about $\frac{1}{2}$ in. in a height of over 31 ft. It is not visible to the eye even on the building, except to those who know it is there and fancy they see it. Yet it is so exaggerated in the model that it is distinctly visible in a photograph which reduces the columns to about $3\frac{1}{2}$ in. in height, and must represent a deflection from the straight line of 4 in. or 5 in. But the most extraordinary blunder is that the metope sculptures are in their wrong places. Beneath the pediment sculpture of the east front are shown the metope sculptures which belong to the west front, and *vice-versâ!* This is a curious example of the light-hearted indifference of French archæologists to accuracy in matters of this kind. All the infor-

mation as to the real positions which were occupied by the metope sculptures is easily accessible at the British Museum, but we presume it could not be supposed possible that a French *savant* could learn anything from English sources. It is a pleasant consideration for the New York people, who have probably paid a large sum for a model of the Parthenon containing, besides minor inaccuracies, a serious blunder which the most ordinary care and investigation might have prevented.

THE promoters and framers of the new proposed Glasgow Building Regulations Bill seem rather to have laid themselves open to opposition by the sweeping nature of their clauses and the rather high-handed manner in which it seems intended to carry them out. The measure is no doubt a very well-intended one, but it has obviously been framed in the first instance without sufficient regard to what is fairly practicable under present circumstances. A good many modifications have been made in the direction of a more moderate policy; but we agree with some of the critics of the measure in thinking that one of the first points to be considered in connexion with such a Bill should have been the provision of a better-constituted authority for the administration of building legislation. Is is perfectly evident from what is stated (and not contradicted) in the Glasgow press, that the Dean of Guild Court, with its constant change of direct personal authority owing to the system of election of a new Dean of Guild every two years or so, is on this if not on other accounts a most unfit authority to deal with permanent building legislation. On the other hand it is perfectly evident that a good deal of the opposition comes from landlords and others who are concerned for their own pockets more than for the public good. A proposed By-law that no building should exceed the height of the street on which it abutted has provoked violent opposition, and is characterised in a leader in the *Glasgow Herald* as "absurd," while a memorial from the Glasgow Institute of Architects speaks of it as injurious and uncalled-for, and one which would lower the value of some of the most important sites in the city. Such a By-law certainly should not be passed without the reservation of a dispensing power in special cases; but in the main a restriction of height of buildings in proportion to width of streets is in accordance with the best sanitary opinions of the day, and the Glasgow Institute of Architects must be rather behind the age if they are not aware of this. Such legislation is distinctly for the good of the city community generally, as promoting both the health and the pleasant aspect of a city, and the fact that it will prevent some owners of sites from making as much out of them as they otherwise would is an entirely secondary matter in relation to wider public interests. The clause has, it appears, been entirely removed in deference to what we should call one-sided and rather ignorant criticism. For our part, we hope the principle will not be lost sight of, and that it will be retained in some form or other in the final arrangement of the new regulations.

THE strike of engineers on the Tyne, &c., still continues, and a good deal is being made of the fact that in some cases the notices were given by the employers, the dispute being generally referred to at meetings of the men as a "lock-out." Sir C. Palmer,—at whose establishment the dispute practically commenced,—protests against this as being altogether misleading, and states that the whole trouble might have been avoided had the fitters agreed to have the questions at issue submitted to arbitration. One effect of these unlooked-for stoppages in the shipbuilding industry is to increase the difficulty of estimating the cost of and probable time occupied in constructing vessels. This was demonstrated by the managing director of the Thames Ironworks Company (and also by the First Lord of the Admiralty and the Director of Naval Construction), on the occasion of the launching of the cruiser *Grafton*. During the construction of this vessel, the gates of the builders' yard were picketed for eighteen months, so that the men employed were unable to go to and from their work without running considerable risks. Again, at the Newcastle Chamber of Commerce last week, Sir B. C. Browne, a large employer of labour in the disaffected district, stated that when the dispute occurred between the carpenters and joiners a year or two ago, an order for a steamer went to Scandinavia which would have been given to his firm but for the stoppage. The question then at issue was very similar to that which has brought about the present deadlock, and the recurrence of strikes of this nature must produce hesitation as to the acceptance of large contracts,—possibly to the permanent injury of the whole district. It seems strange that the men cannot recognise this, and make an effort to adjust their differences amicably. Certainly ship-building proper is not so much affected at present, but what has been said of ship-building applies equally to ship-engineering.

THE correspondence which has recently taken place in the *Times* on the subject of professional persons taking commissions without the knowledge of their principals, has done no more than again call attention in a public manner to what is well known to nine out of every ten men of business. But until agents are prohibited by law from taking commissions without the knowledge of their principals, this practice will flourish. The competition of the present day is so keen that men will do anything to gain business. It must be admitted also that in some respects the giving and taking of commissions behind the back of the principals is not so injurious to their interests as might at first be supposed. Thus, if an estate-agent gives back part of the commission on the sale of an estate to the solicitor who has introduced the business, the principal does not suffer, since if this part of the commission which he has paid did not go into the solicitor's pocket it would have remained in that of the estate-agent. We do not defend the practice, for its indirect results are often bad; but, on the other hand, it is desirable that the public should not be under the impression that they will get much direct advantage by its legal abolition.

THE destruction by fire of the Hotel Royal at New York directs attention to the dangerous character of these large buildings,—a subject to which we referred in a recent "Note" in regard to the action of certain insurance companies in Chicago. Such a building as a large hotel of great height is not safe without a watchman constantly on guard throughout the night, and it is essential also that means of escape should be easy and numerous. We are aware that it is easier to give the latter advice than it is to carry it out, and those who erect these buildings will certainly try if possible to avoid everything which does not tend to profit. It has been pretty well demonstrated, indeed, that enormous buildings of a public kind, such as hotels, will have to be periodically inspected by the public authorities under legislative directions, if there is to be real security for the members of the community by whom they are used. We have fortunately been free in this country from such calamities as that which has just occurred at New York, but it may well serve as a warning to us to be on our guard.

IT was gravely announced in an evening paper a few days ago that the Midland Railway Company contemplate introducing dining and sleeping cars on their long-distance trains. This information would appear to be some years behind-hand, but the words "third-class" had probably escaped either the scissors or the paste-brush, as we understand that this enterprising company are about to try the experiment of running third-class sleeping-cars on some of their trains. The rapid advance in the matter of accommodation is one of the most remarkable features of railway development in this country, and to the Midland Company much of the credit for this must be given. That their policy of making things as comfortable as possible for their patrons is a wise one, is evident from the increasing prosperity of the line, as measured by the gross receipts; although the expenditure it entails apparently tends to keep down the amount available for dividend. The past half-year has been one of the most successful in the history of the company, which has now reached a position second only to the London and North-Western as regards traffic receipts. But in spite of the increase in gross earnings, the dividend declared is at the same rate as that for the corresponding period last year, with a smaller balance to be carried forward. The announcement to which we have alluded may, therefore, be received with some disfavour by shareholders who have an eye to economy; but the travelling public are too quick to appreciate any additional comforts that are offered them for there to be much room for distrusting the action of the directors,—especially in view of the increasing competition for the passenger traffic to and from the north. Another effect of this announcement will be to make the less-favoured third-class travellers on some of the southern lines devoutly wish that similar incentives were at work on their side of the Thames. The contrast in accommodation is striking enough already.

DR. A. KÖRTE, in a letter to the *Berliner Philologische Wochenschrift* (February 6), suggests an addition to the list of the supposed hypæthral temples of antiquity. The temple of Apollo at Delphi was not included in the instances cited by Dr. Dörpfeld in his recent article on the subject ("Athen. Mitteil.," xvi., pp. 334-344). The reason given by Dr. Körte for supposing the temple to be hypæthral is curious and ingenious. In a passage in Diodorus (xvi., 27),—a passage which, by the by, seems so far to have escaped the attention of the warmest supporters of the theory,—there occurs the following statement:—"An omen occurred to him (*i.e.*, Philomenus), also in the Sanctuary of Apollo,—an eagle that was hovering over the temple of the god swooped down to the earth in pursuit of the doves that were reared in the sanctuary and caught some of them from the very altars." Dr. Körte thinks that, if the eagle came down straight, as birds of prey usually do, he must have descended through a hypæthral opening. The passage is certainly worth noting, but it does not seem to us absolutely conclusive. An eagle might appear to be hovering over the actual temple (ὑπερπετόμενος τὸν νεών) to one standing outside it, and yet come down straight enough and alight on an altar *outside* the temple but within the sanctuary (ἐν τῷ ἱερῷ).

SINCE the publication of Mr. J. G. Frazer's "Golden Bough," the Temple of Diana at Nemi has become a reality to many to whom it was before a bare name, if so much. Probably, however, there are still some who are not aware that the antiquities discovered there by Lord Savile, in his recent excavations, are now lodged in the Art Museum of Nottingham Castle. If sufficient subscribers are forthcoming (200 is the minimum) Mr. Wallis, the Director of the Museum, proposes to publish a descriptive catalogue of these antiquities in quarto size, with illustrations and views. Lord Savile is to contribute an account of the discovery of the temple, of which there will be a ground-plan, and all the principal objects found will be reproduced in photo-mezzotype. These objects range in date from B.C. 300 to B.C. 80. The coins are an unusually complete sequence, beginning from the "aes rude," and containing fine examples of every type and fraction

of the Roman "as." There are few sculptures, but one portrait bust and stele, inscribed (of Fundelia C. F. Rufa), to judge from the specimen illustration, is certainly a very fine piece of work. There are also a multitude of terra-cottas, personal ornaments, sacrificial utensils, and many architectural details. Among the bronzes are many statuettes of nymphs and priestesses of Diana, and a remarkable sacrificial ladle inscribed Diana in archaic characters.

WHEN, at the beginning of this century, iron pipes were placed down the face of the Castle rock of Edinburgh, to carry off the sewage, it was thought to be a great improvement upon the state of matters which previously existed. The advance of civilisation is conducive to fastidiousness, and now the exposed pipes cannot be tolerated, and are in course of being removed. The sewage will then be carried off by hidden conduits.

THE space in the Scottish National Gallery is now too restricted to allow of a proper display of the existing art treasures. No room can be found for some recent bequests, and works offered by the Royal Scottish Academy have been refused, — works which are, undoubtedly, superior in art-work and public interest to many of those now in the Gallery. The Government have given a grant of 1,000*l.* a year for the purchase of pictures, and it is obvious that more extended premises are required, so that the new works acquired from the grant and those gifted to the nation may be made available for public delectation and instruction. Two courses are open,—either (1) that the Royal Scottish Academy shall be required to vacate the portion of the premises allotted to them, and be provided for elsewhere, whereby the National Gallery would be doubled in space capacity; or (2) that the present building be given up entirely to the Academy, and a new National Gallery erected. In the event of the latter course being resolved upon, it is suggested that the National Monument on the Calton Hill should be completed and made available for the display of the national art treasures. To finish the National Monument according to the original conception would require a larger sum of money than it is probable would be forthcoming, but a modification of the too ambitious design might be carried out at a moderate cost, and a building produced worthy of the site and suitable for the purposes of an art gallery. Indeed, such a design was prepared, and exhibited, by the late Mr. Dick Peddie, and in that design he made use of the existing pillars which form a conspicuous feature in the Scottish capital. Mr. Dick Peddie did not carry the rows of Doric columns along the flanks of the building, and the eastern portico was much simplified. When it is kept in view that, through the munificence of Mr. Findlay, Scotland has been supplied with a National Portrait Gallery (in which, by the way, are placed several portraits which formerly occupied space in the National Gallery), it would not to be too much to expect that Government should provide funds for the proper housing of the present collection, and of future additions thereto. Were this done we have reason to believe that donations of works would flow in which are now withheld.

IN one of the cellars of the British Museum there are now being put together some fragments of a very interesting terra-cotta cornice of probably the sixth century B.C., found at Civita Lavinia by Lord Savile. The corona of the cornice is faced with thin plaques of terra-cotta with low relief ornament and with many traces of colour. The peculiar point about it is that the terra-cotta veneer forms at its lower edge a serrated ornament or fringe which is visible both at front and back, and in fact reminds one not a little of the facias formed of boarding, with the ends cut into ornamental shapes, which are often seen in railway-station verandahs and other such erections: another instance that there is nothing new under the sun. This terra-cotta fringe is painted and ornamented both on the back and front. Above the cornice are disproportionately large antefixæ formed of heads with a large open-work ornament making a kind of nimbus round them.

SARACENIC ARCHITECTURE.*

BY PROFESSOR AITCHISON, A.R.A.

I MUST now transport you to Persia, not because the Persian buildings we have delineated are in regular sequence to those described in the last lecture, nor are even of antecedent date, but merely to show the peculiar forms that Moslem art took in that country, which was the first they conquered. The peculiar form of arch was, in all probability, first adopted to save centreing; the springing of the arch was probably carried to the slipping-point, and then continued in a nearly straight line until it touched the centre line. It much resembles the four-centred Tudor arch, and is now said to be struck by a reel of string, the marking-point being held in the hand, and moved as the string unrolls until it reaches the centre line, the reel being held by a pin running through its middle and placed in the centre of the small radius. We know more about the modern method of building in Persia than about any other contemporaneous work in the East, through the sagacity and perseverance of Mr. C. Purdon Clarke. He saw much work done in Persia, had some done under him, secured a large number of the architects' pattern-books, and discovered some of the rules by which the architects work; and these rules are understood by the builders and workmen. Probably something of the same sort prevailed in Mediæval times in Europe.

In Persia the only drawings required are plans, with details for stalactites, inscriptions, and other ornaments. The drawings are made on squared paper mounted on boards and varnished, the solid parts or walls are shown by tinting the whole or portions of the squares with Indian ink. Every room and opening has its height proportioned to its width by a fixed rule, and a similar rule is observed as regards the formation of stalactites, so that, given the plan of the stalactites, the builder can lay down the lines, and the plasterers can properly finish them. I think all the architectural students will be interested in knowing how these mysterious creations of the Saracens' mind are now formed. A stalactite dome or ceiling is done thus,—the floor of the chamber to be thus ornamented is levelled and strewn with ashes and then struck with a rule; on this a coating of plaster of Paris is laid and floated; the builder then sets out the full-size plan from the architect's drawing on the plaster floor, making the lines with a blackened cord, as our carpenters do with a chalked line; his men then cut a V-shaped groove in the plaster with the black line for its centre, and when the plaster cuttings are swept off the whole is saturated with hot melted suet, to prevent the castings from it sticking to the mould; the first or lowest plan of the stalactite ceiling is then run, taken up and cut into the shapes marked by the projecting V ridge; each piece is then fixed in its place by plaster on the wall and supported by ties made of bits of stick or reeds secured to the wall and the plaster slabs by dabs of plaster. The plasterer then works down the stalactites to their proper shape, which he knows by heart, and then another line of plan is cast and put up in the same way, the great pendant stalactites being supported by iron cable chains made rigid with plaster. I went over to Paris early in 1878 to see this work done by the Shah's men in a little pavilion he had erected in the grounds of the Exhibition, but when I got there all the stalactites were just done.

I look on the discovery of the Persian architects' pattern-books as the most curious and important discovery, to us, that has been made in this century, as regards the habits and practices of the past, as it is quite within the range of possibility that this practice has descended from Saracen times. As far as I understand the matter, the pattern-books contained plans of buildings the architects had designed, and possibly others, and all the well-known domes and stalactites, so that the employer had only to choose his plan, or to state what additions he required to it, or on what scale he wanted his mansion or palace built, and to choose the pattern of the stalactites, domes, wood, and plaster-work. Occasionally the architect had original designs of his own for new arrangements of domes, stalactites, plaster-work, doors, sashes, and wood-work, and we may be sure that a wealthy and tasteful employer would require larger reception-rooms than ordinary, magnificently enriched, and would prefer having the last fashion, or a new one, for his mansion and rooms.

Besides the peculiar forms of the arches and domes, and the stalactite enrichments, there are two striking features about Moslem art in Persia, one architectural and one decorative. The architectural peculiarity is this: That frontispieces of oblong shape are erected to mark entrances; in these are large four-centred arches, with recesses at the back, mostly covered with half-domes, carried on squinches, and frequently enriched with stalactites. These frontispieces are also found in the centres of each front of the courts of mosques, and greatly resemble the ancient Roman exedræ. The only modern instance of a similar feature that I know in Europe is the triclinium of Pope Leo III., close by the Scala Santa, in the Lateran Piazza. Whether you like this feature or not, it must be admitted that it is a striking one.

Ispahan, from which most of the illustrations are taken, is situated midway between the head of the Persian Gulf and the Caspian, a little to the eastward of the head of the Persian Gulf, and is in that division of Persia called Irak-ajemi. The air is said to be so dry there that iron does not rust. A mosque seems to have been built there in the Kaliph Mansur's time, which has been replaced by the Mesdjid-i-Djuma, though a crypt of Mansur's time is said to be under it. The reason that nothing earlier than the sixteenth century remains is possibly due to Ispahan being taken by the troops of the destroyer Genghis-Khan, and subsequently to its being stormed by that scourge of God, Tamerlane. He admitted the town to capitulation and tribute, but, from the excesses of his collectors, a riot took place, in which most of his people were killed, and the Persians then defended the town, and it was taken by storm. Afterwards, in cold blood, Tamerlane sent his men to butcher 70,000 of the people, whose heads were formed into a pyramid on the plain in front of the town. He seems to have been in an amiable humour, as on like occasions he was wont to build towers, whose walls were composed of living persons laid in mud. Though the Saracens occasionally ground the corn for their army with rivers reddened with their conquered enemies' blood, there are no accounts of atrocities quite equal to those of the Monguls.

The great frontispiece in front of the vestibule of the sanctuary, at the mosque of Mesdjid-i-Shah at Ispahan, is oblong, 75 ft. wide, and 108 ft. high. The arch within it is about 57 ft. wide, and 79 ft. high to the crown. The frontispiece is flanked by two cylindrical minarets, and has a dome behind it, which towers above the frontispiece. The dome covers the space in front of the niche.

The decorative peculiarity is the use of brilliantly-coloured enamelled bricks or tiles for facing, ornamented with scrolls. Almost all important external work is so finished, including domes. The patterns on domes are made by inlaying or by cutting plain-coloured tiles into the required patterns. In the tile work at the Alhambra the texts are inlaid. The effect of a whole building executed in brilliantly-coloured pottery must be very splendid. There is a great opportunity in London and in all manufacturing towns for the use of this material, which would have the advantage of substituting for the dingy brick or stone a beautifully-coloured front; it would greatly add to the brightness of the streets and could be easily cleaned by a hose.

When the western part of Persia, with its capital Medain, fell into the hands of the Saracens (in 15 or 16 A.H., 636 A.D.) in the second year of the reign of the Kaliph Omar, and about two years after the great battle of Cadesiya, the Saracens had no architecture of their own, and had come upon the architecture of a civilised people. Here was the palace of Chosroes with its white pavilion; one of its

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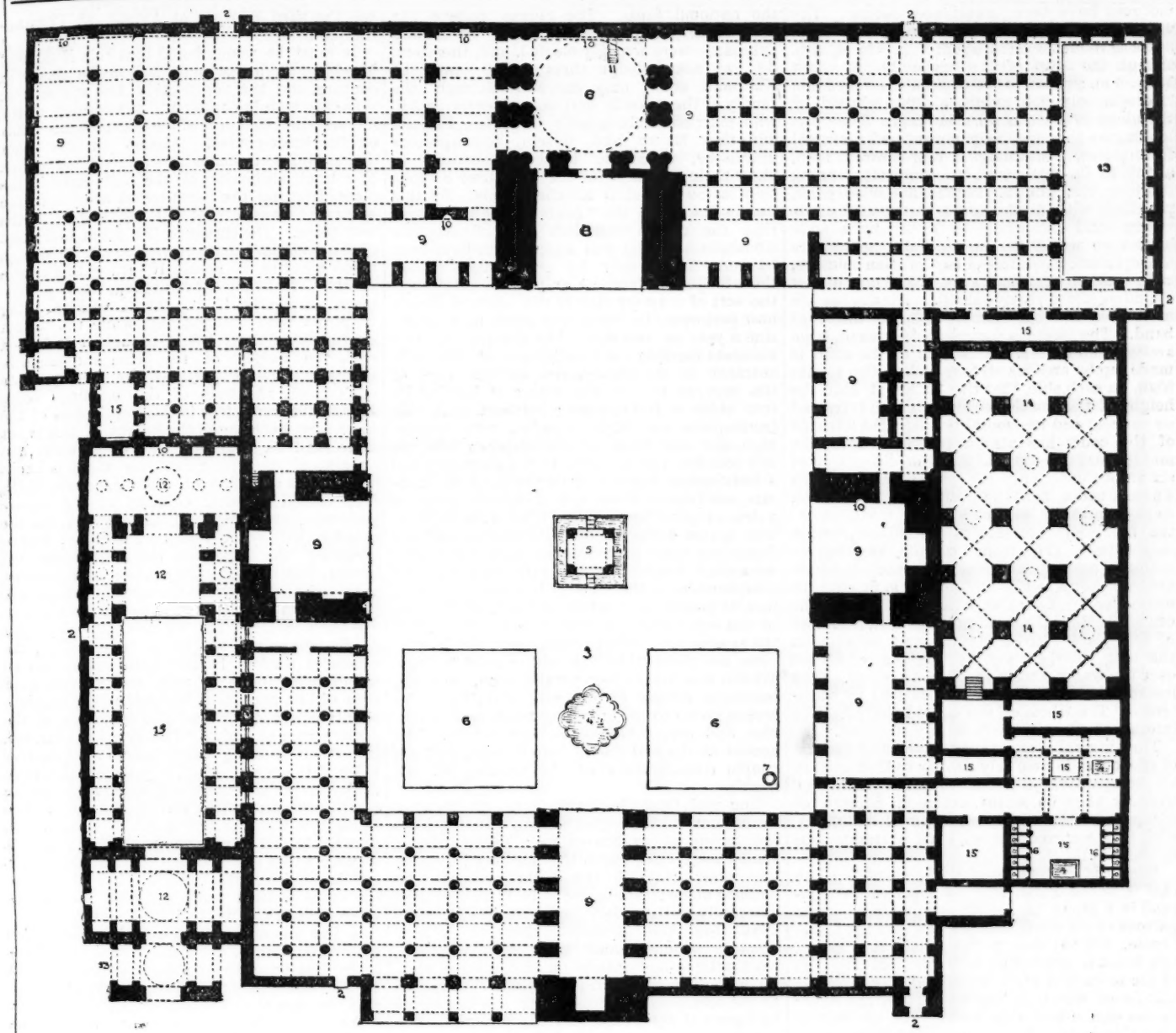

1 – Principal gate of the Mosque.
2 – Smaller gates
3 – Grande Cour
4 – Cisterns for Ablution.
5 – Oratory.
6 – Platforms for prayer in the open air.
7 – Basin containing drinking-water.
8 – Sanctuary with Dome & minarets.
9 – Various Sanctuaries.
10 – Kibla
11 – Mimbar
12 – Mosque of Abd-Lazis.
13 – . . . . . Principal Entry.
14 – Old Mosque.
15 – Courts
16 – Latrines.
Scale of 10 5 0 10 20 30 40 Metres

Plan of Djūma Mosque, Ispahan.

grand halls was used by the conquerors for a mosque. The whole of Persia was conquered in Omar's time, about 643 A.D. The Persian Empire, however, extended to the Oxus and the Indus, and this part was not conquered till the reign of Moawia.

About fifteen miles above Medain the second Abbasside Kaliph Mansur founded Baghdad in 145 A H., 762 A.D , and Medain was destroyed, at least as far as the Saracens could destroy it, to supply materials for the new city of Baghdad. An arch near the Tigris resisted all their efforts, and was to be seen from the Tigris some forty years ago, but has, I believe, since fallen. (Photograph, taken about forty years ago, exhibited.)

The great congregational, or Friday, mosque at Ispahan, Mesdjid-i-Djūma, also called the old mosque, is said to have been originally built by the Kaliph Mansur, though it has been altered and added to since, if not rebuilt. It is situate not far from the north gate Tokhtchi, in that part of the town that is to the north of the river Zendehroud, some 2,228 yards above the mosque of Mesdjid-i-Shah. The mosque is about 462 ft. long by 406 ft. wide over all; but it is not a perfect oblong quare, but is slightly T-shaped, and seems to be a collection of at least ten mosques, though it is in many respects like the early congregational mosques that were described in the last lecture. That which looks like the original mosque is of a more strongly-marked T shape, the sanctuaries on the Kibla wall forming the head of the T; there is a large oblong courtyard with triple aisles to the right and left, and with five aisles on the side opposite to the main sanctuary forming the upright of the T. It looks as if the external mosques had been subsequently added, a covered one on the right with courts, and an open one on the left of the side cloisters. The court itself is an oblong square, about 213 ft. by 180 ft., with a basin of water in the middle, with an oratory over it, with two paved spaces about one step high, and a basin, with a jet of water. This court looks on plan as if it had been laid over the centre of a Latin cross, allowing the ends of the four arms to project beyond it; the bulk of the supports of the mosque are piers, but there are some columns, twenty-nine in the left sanctuary, and eight in the right, and there are forty-three in the left hand and back cloisters. The court itself may also have been used as an open-air mosque, as the two raised spaces, about a step high, may have been used instead of Dikkas, or tribunes.

In Egyptian mosques, the niche is invariably semi-circular, although you will recollect that it was not introduced until the year 53 of the Hegira, and the use of this semi-circular niche is confined to mosques, and is carefully avoided in lay buildings; but in Persia, a square recess or half of a stepped square is used indifferently with the semi-circle; to take the niche wall, beginning at the left, there is a narrow sanctuary and niche, then there are the nine aisles, only these are arched both ways, then another narrow sanctuary touching the vast piers of the main one, which is domed; to the right another narrow sanctuary, then ten more aisles, and an open court, equal in width to three aisles; the left side goes into the flank, up to the arm of the cross, and is twelve bays deep from the niche wall,—the left side is only eight bays deep. Behind the piers that form the sanctuary-side of the court are two spaces right and left of the recess; that to the left is a sanctuary with a niche; on the right flank of the court are two small mosques; both arms of the cross have prayer niches. The two outside

mosques have been mentioned before. The vaulted mosque on the extreme right is groined, and has immense piers, about 6 ft. 8 in. square, though the span of the arches is but about 16 ft. 6 in.; possibly these piers are very high. There is only one pulpit, at the right side of the niche in the central sanctuary. The court looking to the sanctuary consists of a central frontispiece, containing a four-centred arch, about 43 ft. span, with an archivolt running down to the plinth; beyond are wide piers, panelled, with arches and square panels alternating, and the whole is framed by a wide border, on which are inscriptions; behind are two cylindrical minarets, like Egyptian columns, with stalactite cornices, and with their thinner cylinders above partly ruined. At the back is a pointed bulbous dome, with an inscribed band. The recess is domed on a series of large arched semi-domes. This side of the court is made up by arcades of four arches, two stories high, on each side, that rise to about half the height of the frontispiece; each arch is framed by vertical and horizontal bands. The left side of the court has also a frontispiece in the middle, and two-story arcades on either side of six arches each, only the pieces enclosing the single arcades, next the frontispiece, are higher, so as to make a sort of stepped frontispiece; the half dome of this is carried on Persian stalactites. The front of the frontispiece seems to be of plain brick, but the spandrels are in patterns, while all the rest is faced with enamelled brickwork on a marble plinth. The central basin, with the oratory over it, is formed of four piers, with slender columns between on the long sides, carried by four-centred arches over the water, and is reached by steps. The flat roof has projecting eaves, carried by cantilevers. The whole of the court is paved. The interior of the mosque is mainly stuccoed.

The external arrangement of the architecture of the court is precisely similar to that used in all comparatively recent Persian buildings, whether they be khans, colleges, palaces, or mosques,—*viz.*, two-storied arcaded buildings, with four centered arches, with a frontispiece in the middle.

Nearly in the centre of that part of Ispahan that is on the north side of the river Zendehroud is a group of buildings, consisting of the palaces of the Shah, the bazaars, and the horse-course, set out nearly due north and south; this block is connected with the southern part of the town by a grand cloistered avenue, in the middle of which is the bridge over the river; on the east side of this avenue the grounds of the palaces abut. At the south end of the group is the great mosque Mesjid-i-Shah, whose kibla is nearly south-west. The entrance to the mosque is in the middle of the south end of the bazaar, which surrounds the horse-course, and to get the entrance to the court of the mosque in the middle, too, the north angle of the mosque is cut off. It was built by the great Shah Abbas I., who took Baghdad. He was born in 1557 A.D., and died in 1628 A.D.

This mosque is like the later ones at Cairo, almost without columns, and has a central court with four arms, like the mosque of Sultan Hasan at Cairo, only in that case the arms take up a larger proportion of the sides of the court, while in this mosque the widths of the openings of the arms are about a quarter of the length of the side. The arm forming the mosque at Sultan Hasan's is 68 ft. 6 in. wide, while here it is but 56 ft., and is divided from the sanctuary by a wall, the main entrance to Mesjid-i-Shah being in the centre of the horse-course, and the exit being in the centre of the court. The two axes of the doorways make an angle. The same device was used here that Sir John Soane used in the passage to the Rotunda at the Bank of England. The mosque is very nearly an oblong square, with the north corner cut off, and is 341 ft. deep and 423 ft. wide; the supports are wholly walls and piers, except six octagonal columns that divide the side sanctuaries into two aisles each. At the niche end there are two open-air mosques, one to the right and one to the left, with basins of water for ablution. These two open mosques have two half-round niches to each; the domed sanctuaries on either side of the central one have rectangular niches, and the centre sanctuary has a stepped half-square for its mehrab, and is almost cut off from the side sanctuaries by the huge piers that support the great dome. There are certainly five separate mosques, if not nine, four with half-round niches and five with square ones.

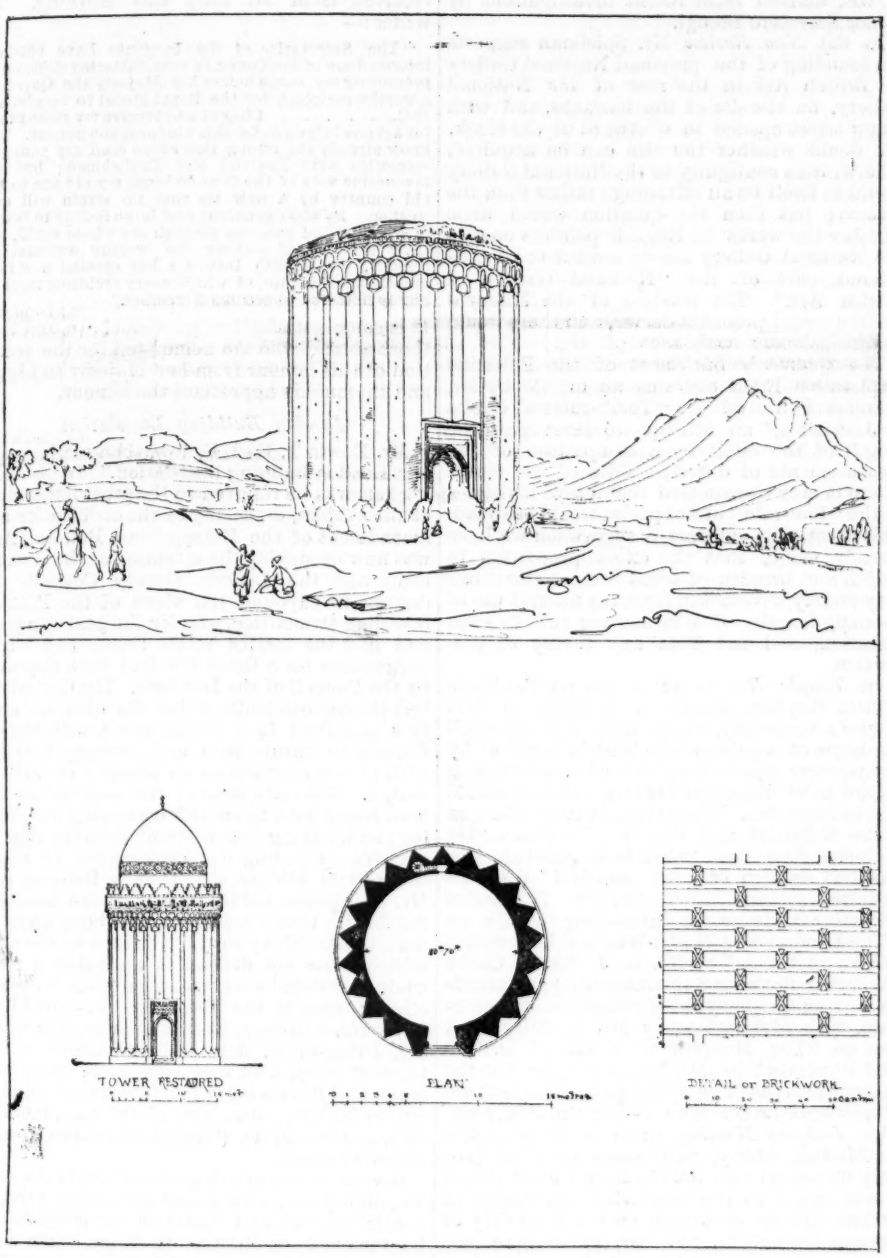
The Persians were mostly Shiyas,—*i.e.*, of the main heretical sect,—and the Shiya creed is now the national faith. The Shiyas believe the first three Kaliphs,—Abu Bekr, Omar, and Othman,—were wrongly elected, and, therefore, do not acknowledge them; they say the Kaliphate could only descend through the family of the Apostle, and consequently by Ali, who married Mohammed's daughter, Fatima, and that Hasan and Hosein, the Apostle's grandsons, were the legal successors; to show their contempt for the first three Kaliphs they tattoo A and O on their heels. By this means Harun, in the "Arabian Nights," knew that the corpse was not that of Aladdin Abushshamat, who was supposed to have been hanged. There may be peculiarities about these Shiya mosques. A graphic description of the sort of mystery play of the death of Hosein now performed in Persia was given in a magazine a year or two ago. The mosque has two minarets flanking the frontispiece of the main entrance in the horse-course, and the court of the mosque has in the centre of each of its four sides a frontispiece; between each side frontispiece are triple arcades, two storeys high, and each flank of the entrance side has five arcades. The entrance to the sanctuary has a frontispiece flanked by two cylindrical minarets, and beyond them rises a bulbous dome on a drum pierced by windows filled with lattices. The spaces between this frontispiece and the flanks are filled with arcaded walls faced with enamelled bricks, divided into two unequal compartments; the division is marked by ornamental panels on a white ground, all the rest of the court having a blue ground. In each of the spaces are arches; those next the frontispiece are about 34 ft. 6 in. wide and 36 ft. high. Within this is another parallel arch, recessed, leaving a margin of 5 ft. all round; the outer arches go up to the crowning band, or flat cornice, and are, therefore, in one height. The arches at the end are in two storeys, and are simple combinations of the arcades of the flanks.

The real dome is about 71 ft. in diameter inside, carried on squinches, and 124 ft. from the pavement to the crown; this carries a timber roof, which, with the masonry filling up the lower part of the bulbs, support the bulbous dome; this is about 90 ft. in diameter externally at its widest part, and 164 ft. to its apex from the pavement; beneath it is a circular drum, pierced with eight windows, with lattices, and stands on an octagonal platform, the face of which is arcaded. The angles of the recesses are brought into the half-circle by means of squinches, and the present one in the horse-course is carried in the same way, only the form is hidden by its stalactite decoration. The decoration of the mosque is superb; above the marble or alabaster plinth, which is about 7 ft. high, the whole of the facing is of enamelled pottery; the ornament mainly consists of coloured scrolls on an azure ground; the minarets have a green ground, covered with a large pattern of crosses set anglewise; the crosses have a line of dull red as an outline, while at a little distance inside the form is repeated by black dots, and inside this again with white ones; the capital or gallery is of a golden yellow with an inscribed band, with the letters in black and the panels above, and those of the stalactites have blue panels with white flowers in the centres; the outside of the dome is enamelled and diapered in colours, with a flower in the middle of each diaper; below the dome is a band of blue, with an inscription, and below this inscription the whole drum is of enamelled bricks down to the octagonal platform; the walls, arches, and semi-domes of the frontispiece have an azure ground, enriched with coloured patterns, and the top of the semi-domes is of golden-yellow, with slight coloured patterns. The view on entering the court must be magnificent, with this splendour of colour, and the vast archway over 60 ft. wide, and nearly 100 ft. high, facing you with its grandeur enhanced by the low buildings on the flanks, while through the two-fold gloom of the recess, and the sanctuary, the light of heaven is seen through the piercings of the lattice over the mehrab. It may not be quite equal in monumental grandeur of colour to the superb friezes of Darius' Palace at Susa, now in the Louvre, with the green-bearded troops of the White Nile, but it still keeps up the traditional glory of the enamelled ware of Mesopotamia. The inside is also covered with enamelled pottery, except the plinth, which is of some marble like agate, and when lit up with thousands of lamps must have the appearance of fairyland. I did not see the tiled mosque of Ahmed at Constantinople lit up.

It must be remembered that this Mosque of Mesdjid-i-Shah was built late in the sixteenth century, and has remarkably few stalactites; these are mainly confined to the cornices of the minarets and that part of the entrance that abuts on the horse-course. Almost all the other domes and semi-domes have intersecting arches. The brick stalactites of the half dome of the recess fronting the horse-course are cut in the elongated voussoirs of the inner shell of the half dome. The thrust of the great half dome of the sanctuary must be very great, for though it has a radius of nearly 100 ft., with a centre nearly 40 ft. below the springing, the top abutment is nearly 11 ft. thick, besides being weighted with the parapet, while the bottom abutment is 13 ft. thick, though it is loaded with the weight of the drum and dome in addition. The proportions are not quite to one's taste, the bulk of the openings being squat; the best piece is the frontispiece of the sanctuary, but though the height of this is not more than an additional fifth of its width, the opening of the grand archway itself is about three-fifths of its height. The minarets, which are, to all intents, columns on tall square pedestals, are about 5½ diameters high, but the wooden balustrade and roof increase this to about 6¼; the finials are but small cylindrical shafts, with flat bulbous domes, and contrast very unfavourably with the elegant minarets of Cairo. The four-centred arches of the openings are not agreeable, but the most probable cause of the shape was to get rid of centreing; the whole of modern Persian architecture has an air of being done by rule, and no very good rule either, and lacks altogether the apparent spontaneousness and artistic invention of the architecture of Cairo. The grand exedræ, too, lose much by being nearly alike on all the four sides of the court. Still, in spite of all adverse criticism, the effect of these magnificent exedræ must surpass anything else in the world. The same style was pursued, and is, to some extent, pursued to this day in every building, though it became duller and more mechanical the later it was in date, and the taste in colour diminished till quite modern work is garish and vulgar when seen in the light of this country.

A few monuments, however, that have been delineated deserve mention. The principal one is the blue or orthodox mosque of the Sunnis at Tabriz, the ancient Tauris, in Azerbijan, midway between the west side of the Caspian and Lake Van. This mosque was ruined by an earthquake in 1721; it was built by Djehan Shah, one of the Mongol Princes of the dynasty of the black sheep, in the fifteenth century; it was called the blue mosque from the prevalence of blue in its enamelled brick decoration. Its plan has a strong family resemblance to that of Sta. Sophia at Salonica, only its sanctuary is rectangular, with a small, half-round niche in a rectangular recess. The narthex goes round three sides, as at Sta. Sophia; the main dome, which has fallen, was about 54 ft., internal diameter; the front was flanked by two minarets at the extreme angles; the frontispiece to the central entrance, which still remains, has its half-dome carried on squinches; the internal plinth is said to have been of a sort of agate. Sultaniah, in the north-east corner of Irak-Ajemi, was built by Argoun Khan in 1290 A.D., one of the descendants of Genghis Khan; his brother and successor, Oldjaïtou Mohammed Khoda-Bendeh, carried on the works with great vigour. In 1305 A.D., the town was called Sultaniah in honour of the birth of his son, and Khoda-Bendeh then built his own tomb-mosque, which consists of an octagonal chamber, with a dome, and the tomb-chamber behind it. This has a half-octagon niche, and a small dome over the tomb. The building is a square of about 120 ft., with the back angles cut off; above, the front angles are cut off, too, making an octagonal base for the dome. The main dome is about 79 ft., internal diameter, with a total external height of 177 ft.

The exterior has a stalactite cornice with a triple arcade below it on each face of the octagon; the arcade consists of one wide central arch with a narrow one on each side; this arcade forms an ambulatory, with a balustrade for protection; the entrance-front is square, with staircases and recesses in each of the square angles, lit by two narrow pointed windows at two levels. In the middle of each of the square sides there is a small doorway enclosed in a frontispiece, with an arch over it



Ruined Tower at Reï, Persia.

reaching to the string of the arcades; within this arch, above the door, is a triplet window. The angles are splayed horizontally with a parallel splay just below the bottom of the arcades; the other faces below the open ambulatory are arcaded. Above the top splay of the stalactite cornice rises at each angle a cylindrical minaret, whose finials are gone; these rise nearly to the height of the top of the dome; the dome and minarets are plastered and ornamented with patterns in blue and white enamelled bricks. This tomb-mosque is supposed to have been damaged on the town being taken by Tamerlane, and since his day the town has fallen into ruins. Reï, the ancient Ragae, where Alexander the Great gave up the pursuit of Darius, is close to Teheran, under Mount Demavend, and near the Caspian; here are the ruins of a brick tower of victory, from which the Persian conquests used to be announced. It is curious as a structure, and also as being characteristic of structures commonly found among the Moslem buildings of India. It is about 50 ft. in diameter, with walls about 6 ft. thick. Externally it is fluted with twenty-two V-shaped flutes, which run up to the cornice, which consists of one tier of Persian stalactites in the flutes, and two tiers of semi-domes above, each tier projecting over the other, with a plain band above, containing an inscription in Cufic characters. The tower is supposed to have been crowned with a dome, and to have had bearded battlements, leaving a passage between them and the dome for the proclamation of victory. The dome has unfortunately fallen in. The doorway is formed by a high four-centred pointed arch in a frontispiece, which occupies the space of two flutes; above the arch of the doorway are three ranks of Persian stalactites. The tower is about 66 ft. high to the bottom of the inscribed band, of which only enough is left to show that it was inscribed in Cufic characters. The battlements were reached by a corkscrew staircase in one of the V-shaped solids nearly opposite the door. Other circular towers of masonry, once domed, but unfluted, are found in the neighbourhood.

Near Ispahan is a little oratory or tomb-mosque flanked by an enormously tall cylindrical minaret known as that of Shah Roustan, who lived in the fifteenth century. The minaret is known to be Moslem from its Cufic inscription; it is 17 ft. in diameter, with a double newel staircase entered from opposite sides, so it looks as if it were originally much used; possibly it acted as a tower of victory as well as a minaret. It resembles a slender Egyptian shaft with a cavetto capital in outline, only instead of leaves there are two vertical bands with knots at the bottom; the finial at the top is ruined, and the wooden balustrade has disappeared. There are traces that show that its decoration was of enamelled bricks, the enamel of which has perished; the height, exclusive of the finial, is 128 ft., the minute oratory is but 26 ft. 3 in. square, with a doorway and external niche, and is crowned with a dome; the point of the dome only reaches to about half the height of the minaret; so they look like the giant and the dwarf. The oratory has one of its angles chamfered, and its faces are perfectly plain; the height of each side is about the same as its width, and is then splayed off into an octagonal band whose height is about a half of its width; at some distance back on this octagonal platform is the dome, which has a doorway level with the battlements, and one window above it which appears to be the sole opening for light. It is a quaint-looking little building, and the two make an eccentric looking group, unlike the usual Persian architecture.

Many of the tombs in different parts of the country are hexagonal or octagonal; the octagonal ones have borders round the sides which enclose one four-centred pointed arch on each face; the hexagonal ones have each side divided into a wide and two narrow blind arcades, the middle one arched in one height, and the side ones in two. From the centre of the platform formed by the flat roof of the polygon, rises a tall circular or polygonal drum covered with a tall roof or steeple, or with a bulbous dome, somewhat reminding one of St. George at Ezra in the Hauran, without the sanctuary. Some of these tombs have quite a Gothic air.

MAGAZINES AND REVIEWS.

THE *Fortnightly Review* contains an article by Sir John Lubbock on "The Government of London," chiefly with the view of submitting some points in regard to the London County Council, for the consideration of ratepayers and new candidates. Among the points to which Sir John Lubbock draws attention are the desirability in some cases of reducing the numbers on committees; the status of the Chairman, whether his office is to be analogous to that of the Speaker in the House of Commons, or to that of a leader of the Government (his opinion inclining to the former theory); the desirability of giving the Finance Committee in all cases the first consideration and recommendation as to any special expenditure; the limitation and definition of the duties of the County Council, on which the ideas of some members are far too extensive; and the housing of the working classes. Sir John Lubbock concludes with the hope that it will soon be possible to secure a suitable site for Municipal Offices, considering that with an adequate building specially planned, concentration, convenience, and economy would result.

In the *Art Journal* Mr. Aymer Vallance continues his articles on "The Furnishing and Decoration of the House" treating of "Walls Windows and Stairs." The illustrations of wall-coverings show the efforts that are now being made to get hold of some new ideas in wall-papers,—efforts which are too obvious, and in which the semi-naturalistic treatment employed in some instances is not by any means decorative in the best sense. The Dean of Gloucester contributes an article, illustrated by some excellent little sketches of the cathedral and bits of the town; the artist's name is not given,—an odd omission in an art journal.

In the *Magazine of Art*, Mr. R. T. Blomfield, in continuing his articles on artistic houses, points out the danger of dilettantism in substituting a mere collecting mania for artistic creation. The public, he observes at the close, have the matter in their own hands: "It is for them to treat architecture as a serious art and to set a higher value on courage, independence and individuality in design, than on unscrupulous cleverness in hitting off the fashion. Plain work, even savage barbarous work, anything is better than fashionable work." It is possible, however, to push this last dictum too far. The article is illustrated by interiors of houses by Mr. Norman Shaw, Mr. Jackson and Mr. Macartney. Considering the stand made in the article in favour of originality, there seems a good deal of modern-antique in the examples. "The Ornamentation of Early Firearms" is an interesting subject, treated by Mr. Greener, with numerous illustrations. An article on the "Reynolds Centenary" is illustrated by some sketches of places connected with Reynolds's life, chiefly from Plympton, his birthplace.

The *Antiquary* has a neat and pointed article on the ivy dispute *re* Kirkstall Abbey, upholding the removers of ivy, and observing that "artists" (*i.e.* painters) who make such a fuss about the removal of the ivy, in most cases care nothing about the architecture, or about any other art than their own, which is assisted by ivy; whereby also, we may add, they are saved the trouble of trying to draw the architecture, in which they are seldom successful. Mr. R. J. Preston contributes some notes, with sketches, on "Some Cornish Bench Ends." Otherwise the number for February is as well and usefully filled as usual.

The *Gazette des Beaux Arts* contains an article on "Les Sarcophages de Sidon," by M. T. Reinach, with some fine illustrations.

There is an article of rather special interest on "Hugues Sambin," a little-known architect and sculptor in wood of the latter part of the sixteenth century. An illustration is given of his design for the façade of the Palais de Justice at Besançon.

The *Contemporary Review* contains an article of some importance on the "Unhealthiness of Cities," by Sir Francis Peek and Mr. Edwin T. Hall, to which (from internal evidence) we shall probably not be wrong in concluding that the last-named gentleman is the larger contributor. It deals first with "sewer-gas," suggesting the principle of having inlets of fresh air at the highest point of a sewer system, and exhaust shafts at the lowest point, in order to draw the air in the same direction with the sewage flow and get the assistance of the latter. Against this must be put the fact that the air in sewers naturally tends to ascend, and it would require rather a quicker current than usual to counterbalance this tendency. However, the suggestion is worth consideration; the main object being to ensure that inlets shall always be inlets, and not inlets or outlets at various times. Other subjects dealt with in the article are "London Fog," "Poisonous Ground Air," "Jerry Building," and "Sanitary House Planning and Construction." In this latter portion of the article we observe the caution that "all cisterns should be well covered" to exclude vermin, dust, &c. To this should have been added the caution that such cover should be easily removable and the cistern easily accessible so as to be readily inspected. In another paragraph, we are glad to see, the authors call attention to the importance of doing away with unventilated hollow spaces hidden from light, as a matter important to the sanitary condition of a house.

In the *Nineteenth Century* the "London Water Supply" is the subject of a paper by Sir John Lubbock, whose main conclusions are "that the question is one of vital and pressing importance; that the population of the Thames Valley is rapidly increasing, and the limits of the present water supply nearly reached; that it will shortly be necessary to go elsewhere for a fresh supply; and, last but not least, that unless we do so soon we may find that the available areas have been appropriated by other cities, and that we are too late;" which is what we urged in nearly the same words a good many months ago. Sir John Lubbock is opposed to the idea of buying up the water companies, but suggests additional supply either by the companies with the aid of the Council, or by the Council by arrangement with the companies; and that an agreement should be made with the companies for dividing future profits equitably between them and the ratepayers. The article is a sensible and judicious one in general, and deserves attention.

In the *Century* Mr. Stillman continues "The Italian old masters" with an article on "Titian," very short and slight for so great a subject, and giving the impression of having been merely written to accompany three engravings from Titian's works. An article on "Pioneer Days in San Francisco," by Mr. J. W. Farmer, is illustrated by sketches of the original streets, the first hotel, &c, which throw an interesting light on the local colouring of Bret Harte's stories of towns in a similar embryo stage, and seem made to illustrate the scenes in "Red Dog" or "Tuttleville."

Harper's Magazine has an article by Mr. Julian Ralph on Chicago as "the main exhibit" of the 1893 exhibition. The article is not calculated to tempt European visitors. The position and the marvellous prosperity of Chicago within so short a time are picturesquely set forth; but we are given also the picture of Chicago as a place of absolute turmoil of money-making, where no one has time to be civil; where if you ask the way you must run by the side of your man to get his answer, for no one has time to stop in the street in Chicago; where to ask a necessary question of a ticket-taker or tram conductor is to expose yourself to gratuitous insolence; and where an average of six hundred people are annually killed by railways on level street crossings. This is not the testimony of a prejudiced "Britisher," but of an American writer in an American magazine; and judging from his account we should imagine that to cultivated Europeans Chicago must prove the most detestable of all the large cities of the world.

The *Atlantic Monthly* has an interesting sketch of "A Venetian printer and publisher of the sixteenth century," one Gabriele Giolito to wit, derived from recent investigations by Signor Salvatore Brongi.

In the *New Review* Mr. Spielman suggests the founding of the proposed National Gallery of British Art in the rear of *the* National Gallery, on the site of the barracks, and with a new street opened to westward of the block. We doubt whether the site can be acquired, otherwise its contiguity to the National Gallery would in itself be an advantage rather than the reverse; but then the question would arise whether the works by English painters now in the National Gallery are or are not to be considered part of the "National Gallery of British Art." The trustees of the National Gallery would probably demur, and there would be dissensions.

The *Quarterly Statement* of the Palestine Exploration Fund contains an article by Mr. Flinders Petrie on the "Tomb-cutters' Cubits at Jerusalem," an attempt to investigate the length of the cubit by a comparison of the measurements of different sides of the tombs where it may be expected that exact multiples of the "foot-rule" of the period would be found. This practically enforces a suggestion we have already made, that the exact proportion in length and breadth of some ancient structures may merely have arisen from the natural use of so many lengths of a measuring rule in each direction, and not from any theory of proportion.

In *Temple Bar* is an article on Benjamin Robert Haydon, chiefly in relation to Tom Taylor's biography, which may serve to recall the name of a painter who is little heard of by the younger generation, and who, whether in regard to his talents or his tragic career, should not be forgotten. The article in *Macmillan* on "The Beautiful and the True" seems rather high-sounding than valuable or pointed; one has had enough of "the beautiful" with the definite article. The *English Illustrated Magazine* includes an interesting article on "The London and North-Western Locomotive Works at Crewe," by Mr. C. J. Bowen Cooke (Assistant Running Superintendent); an article on Brahan Castle by the Marchioness of Tweeddale, with illustrations by Mr. T. Riley, and one on "The Mosques of Tlemcen," written and illustrated by Mr. Edgar Barclay, but the illustrations (as might perhaps be expected) are of pictorial rather than architectural interest. The *Ludgate Monthly* gives a short article on Malling Abbey, with some sketches (not very first-rate), and *All the Year Round* makes a concession to the increasing popularity of archæology by an article on "A Dead City of Etruria," which is, however, picturesque and chatty rather than archæological.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

LONDON BUILDING LEGISLATION.

THE seventh general meeting of this Institute for the present session was held on Monday evening last, the President, Mr. J. Macvicar Anderson, in the chair.

Obituary.

The minutes of the previous meeting having been read and confirmed,

The President said:—Since our last meeting, an architect whose name was well-known has passed away. I do not think we should be content with a mere official or formal notification of his death, and therefore I refer to it specially. Mr. Philip Hardwick was a man whose works were important and numerous, and he occupied a distinguished position. It is with grief that we have heard that his latter days were embittered by a painful illness. He was a man who, while in practice,—for it is now some years since he retired,—was looked upon as an able architect and an honourable man, and it is with great regret that I have to announce his decease.

Nomination of the Recipient of the Royal Gold Medal for 1892.

The Secretary, Mr. William H. White, having read By-law 64, regarding the award of the Royal Gold Medal,

The President said:—I beg to announce that the Council propose to submit to her Majesty the Queen the name of M. César Daly, Hon. Corr. Member, Paris, for his writings in connexion with architecture. I cannot refrain from reading an extract from a letter I have received from M. Daly this morning. He writes:—

"The Secretaries of the Institute have officially informed me of the Council's very flattering decision of presenting my name before her Majesty the Queen, as a worthy recipient for the Royal Medal to be given in 1892. . . . . I beg you to receive my most grateful acknowledgment for this kindness and honour. You know already the strong ties which bind my youngest memories with England and Englishmen; but the favourable vote of the Council binds my old age to the old country by a new tie that no strain will ever weaken. By their generous and large feeling in favour of architectural progress through the whole world, and their decision of seeking the worthy amongst all nations, the English Institute has created a sort of architectural senate, of which every architect must be highly flattered to become a member."

It is some satisfaction, gentlemen, to find that those abroad who are nominated for the reception of this honour from her Majesty so highly and thoroughly appreciate the honour.

London Building Legislation.

Mr. Edwin T. Hall, Fellow, then read a paper on "London Building Legislation." In his opening remarks he referred to the great importance of the subject, especially as the codification and amendment of the Metropolitan Building Acts was now occupying the attention of the Government and the London County Council. He desired to expound the views of the Practice Standing Committee, who for the past two years had had the matter before them, and whose suggestions for a Draft Bill had been approved by the Council of the Institute. The Committee had throughout realised that the question must be approached in a public spirit, with the endeavour to ensure safe and sanitary building with as few restrictions as possible on artistic design. The main lines of the suggestions had been issued with the notice convening the meeting; and, having drawn attention to the importance of excluding the construction of roads, sewers and bridges, &c., from a Building Act, Mr. Hall proceeded to treat with the details of the draft. Great attention had been given to definitions. Many subjects defined by the committee were not defined in the existing Acts, while new definitions had been given to many others; among the former were,—building, structure, wall-sign, warehouse, domestic building, living-room, flat, business offices, story, topmost story, floor area, superficies, cubic contents, and fire-resisting; and the latter included public building, site, base of the wall, foundation, builder, street (instead of roadway), and centre of street.

Several of the existing exemptions to the Act, he pointed out, were manifestly opposed to the public interest, and therefore recommended to be removed or limited in scope, while new exemptions of very small buildings from the general rules of the Act were suggested, but placed under the control of the District Surveyor. An important addition to the Act was the section dealing with the "alteration in purpose or character of a building," and a new section also provided for the restoration of buildings of architectural, archæological, or historical interest; while the section for "rebuilding old buildings" was varied. With reference to foundations and sites, several alterations were suggested. The existing rule as to the thickness of concrete under a wall was inadequate: the suggested section said the thickness of good concrete shall vary according to the height and class of building, and allowed of the omission of concrete, with the approval of the District Surveyor, where the site was "a natural bed of solid gravel or chalk of not less than 3 ft. in thickness." The subject of recesses and openings in external walls had received careful attention, and it was proposed to modify the law by enacting that the recesses and openings *in any story* shall not "exceed one-half of the superficies of the wall of such story in which they are made;" this limit not to apply to that portion of an external wall between its base and 30 ft. above the level of the public footway immediately in front of the centre of the façade, or, where there is no such footway, then above the actual level of the ground before excavation. Turning to party-walls, a principle had been adopted for fire prevention and stability which, it was hoped, would commend itself to all; the theory of ownership in the existing Acts was not interfered with, but the new principle of construction was that there shall be in the centre of the new party-wall a continuous backbone of brickwork, the thickness of which neither owner shall diminish. On its own side only of this backbone could the flues of any

building be placed. Applying the principle, it was proposed that in no case shall the back of a recess be within 4 in. of the centre of the wall. As to the formation and superficial limits of recesses in party-walls, the new section provided that the recesses shall be arched or corbelled over in the height of the story in which they are made, and that their extent shall be measured by width, not area, and that the "width shall not exceed one-half the whole length of the wall of the story in which they are made." As to the section governing uniting buildings, a discretion to the County Council was suggested to consent to the uniting of buildings which were not wholly in the same occupation. In the case of floors of fire-resisting materials such uniting might, he thought, within limits be permitted with perfect propriety. The new section forbade openings in "any party-wall or any two external walls dividing buildings," and further provided that "no opening in such wall or walls on any one floor" shall be "nearer than 25 ft. to any other opening on the same floor;" and the existing section, requiring openings in party or dividing walls to be stopped up, had been made much stronger. Under the heading of "Miscellaneous," an effort had been made to get rid of the public danger arising from advertisements on combustible hoardings "on the face or in front of the external wall of any finished building." Mr. Hall next dealt with "Timber in external walls," bressumers, the height of party-walls above roofs,—treating the last-mentioned at considerable length,—and then turned to the payment of the cost of party-walls and the question of stories in the roof. A new section for "Chimney-shafts from furnaces" incorporated the essentials of the existing rules which the County Council adopted in sanctioning such shafts, while in the rules as to other chimneys and flues many variations in detail had been made. Considerable alterations had also been made as to the construction of habitable rooms, the minimum height, except in the roof, heing increased from 7 ft. to 8 ft., and minimum areas of windows, of dormers, lantern-lights, &c., had been fixed. The Draft next embraced all the building regulations of the Public Health Act for underground rooms let as separate dwellings, and added regulations for other underground rooms not so let; and he considered it a matter of congratulation for the Institute that the Government in framing that Act had adopted so many improvements suggested by the Institute. Projections beyond the general line of building had also received careful attention. The sections had been drawn anew, and it was affirmed that cornices of shops might to a specified extent overhang the public way, but no other part of a shop front encroach on it. Permission for bay windows and similar projections over building-owner's own land was given, thus legalisling what was a pretty general practice; while adjoining owners were protected by the condition that no such projection shall come within 2 ft. of the centre of a party-wall, nor shall it extend outside a line drawn at an angle of 30 deg. from the point in the front of the building where it touches the centre line of the division of the properties. It was a pleasure to note that the County Council, too, in their amendments, had a section with the object to concede greater freedom of design to architects, or rather building-owners; this section allowed, under restrictions, projecting oriel windows or turrets not only over the building owner's land, but 12 in. over the public way. The County Council had apparently considered overhanging constructions only in relation to the public way, for, though right and proper so considered, the limit for oriels and turrets not to be lower than a certain height above the level of the footway was unnecessary and undesirable where they were over the building-owner's own land. The author then dealt with a sub-section designed to ensure the construction of party-walls in buildings subsequently converted into two or more buildings, and a section to secure fire-resisting construction in a building erected or converted into two or more divisions, intended for or adapted to be used as flats, or as warehouses, or which is let or occupied in two or more such divisions, with reference to which an incidental change of great importance was made. The old sub-section said: "Sets of chambers or rooms tenanted by different persons shall in certain buildings be deemed to be separate buildings." The new section assumed a building to be that which it was popularly understood to be, viz., a cube resting on the ground and covered by a roof. Having described the suggested regulations as to "egress from certain buildings" referred to, and the incorporation of section 29 of the London County Council (General Powers) Act, Mr. Hall proceeded to treat of those to govern lift-shafts. Lifts, in the suggestions of the Committee, were divided into three classes,—(1) those which were inside a building with fire-resisting floors containing flats or business offices; (2) those outside the external wall; and (3) those inside warehouses which pass through fire-resisting floors, and where it is not the practice to enclose the lifts with walls. In the first class it was suggested that the lift be separated from flats or offices by brick walls, and all openings into the shafts from within the entrance doors of flats must have an iron door in addition to a wooden one. In the second class the enclosures to the shafts or for cylinders, balance weights, or gearing, were to be either of brickwork, ironwork, or other fire-resisting material approved by the District Surveyor; if the floors of the building are required by the Act to be of fire-resisting construction, then any openings into the shafts from within the entrance doors of the flats, or from any warehouse or business offices, are required to have an iron door as above. In the third class all openings in the floors must have a horizontal door, hatchway, or other cover of iron or other fire-resisting material as specified. With reference to the present maximum of heights of buildings in the 1890 Act, that maximum was proposed to be reduced to 75 ft., and the height of two stories in the roof limited to 20 ft. The provision for open spaces at the rear and sides of dwelling-houses was next dealt with; and, having referred to the many points of view from which this question had to be considered, and the dangers of insuffi cient space, Mr. Hall said the London County Council were now going to an extreme in proposing to require an open space at the rear, not only of domestic, but of all buildings, which space between the opposite backs of two buildings would be practically double the width required between the opposite fronts of buildings. Proceeding to analyse the working of the proposed section, he assumed there were three buildings which were parallelograms,—*i.e.*, with no back additions. Two faced each other: their front walls were 75 ft. high, and they were separated by a street 70 ft. wide; the third was behind, and backed on to the second; between the second and the third was also a road 70 ft. wide. By the operation of the section there must be above the ground-floor of the building 90 ft. between the backs of the blocks, and the external walls forming the backs cannot be more than 45 ft. high, while the front walls, 70 ft. apart, may be 75 ft. high. Could there, asked Mr. Hall, be any justification whatever for such a consequence? The section would afford room for much litigation and its ultimate abrogation by evasion. Which was the front of a building? Or, given two good roads, why should a building have a back at all? Moreover, if the case were bad when there was a back street, it was worse when there was none; for if the depth of a site be 55 ft., the building might then be 45 ft. deep; but the application of the County Council's rule would only permit the rear wall to be 10 ft. high, and the front wall to be 50 ft. high, and that with a sky-line of dull and dreary monotony in a street 70 ft. wide. The varied problems of open spaces had all received careful attention, and he thought upon further consideration the County Council would agree that the necessities of the case were met by the suggestions in the Institute Draft. Mr. Hall then referred to a new section dealing with drains and sanitary apparatus, &c., which left all details to by-laws; and he gave an epitome of matters relating to the construc tion of public buildings, concluding his paper by alluding to questions which had been settled in principle, but not yet formulated by the committee,—among others the making of by-laws, the machinery for settling disputes by the award of the Surveyors, the Tribunal of Appeal, and the duties and remuneration of District Surveyors.

The President, in inviting discussion, said that Mr. Hall had given them a lucid explanation of a very voluminous document. As he saw present several gentlemen who were practically acquainted with all the intricacies of the subject, he trusted that they would have an interesting discussion.

Mr. H. H. Collins said that at that advanced period of the evening he felt he could do little more than propose a hearty vote of thanks to Mr. Hall for his admirable paper. Most of the suggestions made in the draft Bill of the Institute had occupied the attention of various other bodies; but he was very glad that the Practice Standing Committee of the Institute had considered the matter, not with the view of framing a new Bill, but with the view to the codification and amendment of the existing law. In a large number of bodies with which they were all more or less connected, it seemed to have been the idea that a new Bill should be proposed, and he was fearful when he came into the room that evening that he should hear an exposition of new ideas, new notions, and new provisions embodied in Mr. Hall's paper. He was glad that was not so, for he was sure that an Act which had borne the hard test of thirty-six years' wear, and which had not been found wanting in its main principles, was one which deserved to be retained. He did not think it was desirable to have over-legislation in building matters. They did not want to go to school again. Architects, builders, and clerks of works had their minds now pretty well saturated with existing legislation, and he thought that, with some amendment of the existing laws, they would be able to jog on again very comfortably for another thirty-six years. The way in which Mr. Hall had treated his subject had disarmed criticism. In reading a book entitled "Called Back" a short time ago, various criticisms of the proposals therein set forth by the author arose to his mind on almost every page; but on succeeding pages the very objections which had occurred to the reader had been anticipated and met by the author. That was very much what had occurred with Mr. Hall's paper. As it proceeded he (the speaker) saw objections to what was proposed; but when Mr. Hall got a little further those objections were met. With regard to the point about the extension of the footings of party-walls upon each side, the thing was absolutely impossible to carry out in practice, and if it were carried out it would have the effect of leaving an unsanitary space at the side of each house. He was very glad that Mr. Hall had criticised the curious proposal of the County Council as to space at the rear of buildings. If that requirement were worked out to its logical conclusion, it would involve nothing less than confiscation, and it should not be entertained for one moment. He did not think that the House of Commons would be at all likely to agree to any such legislation. He therefore warned all who were promoting this legislation not to overload their ship, or they would be in danger of getting on the rocks and going to pieces. That was so in 1884, when the Bill then introduced contained many of the present amendments. One after another these were eliminated, until at last the Metropolitan Board of Works found that their measure was so emasculated that they preferred to abandon it altogether. He was glad to see that in the new Bill they were seeking to ensure not only safety in case of fire, but the health of the people who might have to live in the buildings erected. He had much pleasure in proposing a vote of thanks to Mr. Hall for his able paper.

Mr. Arthur Baker said he regretted to have heard very little in the proposals before the meeting as to fireproof construction. At Kensington there was just now in course of construction an enormous brick and stone building standing entirely upon iron legs. He hoped that when they got a new Building Act such a structure as that would be impossible. Such buildings were most dangerous, and ought to be prohibited.

Mr. Alexander Payne said that whatever might be their views on the provisions of the proposed new Bill, they would all agree that Mr. Hall was deserving of their very hearty thanks, and he therefore had much pleasure in seconding the proposal made by Mr. Collins. The amount of work which Mr. Hall had done was very great, and the amount of detail which he had gone into was appalling. From his (the speaker's) own experience as one of those who had to assist in the administration of the existing Act and its amending Acts, he knew what a very difficult thing it was, in the first place to know what the Act meant, and in the second place to know how the lawyers would interpret it, and it would be no easy task to clear up all existing difficulties by the proposed new Act.

Mr. Ralph Nevill said he had heard with very great satisfaction that very strict rules were to be laid down in the proposed Bill with regard to the thickness of the walls of the flues of kitcheners. But the remarks which had been made as to the necessity of thick walls behind flues were applicable not only to kitcheners, but to many of the new-fashioned grates, which were almost equally dangerous when placed against thin walls. As to projecting windows, he rather gathered that Mr. Hall saw no objection to projecting windows being brought out over a building-owner's own land beyond the line of frontage, not only at a height above the pavement, but down to the ground; but that seemed to be very objectionable. If a bow-window might be brought out down to the ground beyond the line of frontage, why might not the whole building be brought out? He did not know whether the Institute Committee had yet taken into consideration the schedules of the old Act, but they were certainly open to amendment. He had had a good deal of experience in concrete building, and he had always been very much annoyed by the very foolish provision for stepping concrete foundations. Such a provision might have been applicable to lime concrete, but it was wholly unnecessary in the case of concrete made of selenitic or Portland cement, which rapidly became as hard as stone.

Mr. Edmund Woodthorpe said he should be glad to support the vote of thanks to Mr. Hall, knowing the immense amount of labour that he had spent on the subject during the last two years. With regard to the question of lifts, or rather lift openings, he thought that some special attention should be given to the subject, with a view to the prevention of fire. The need of every possible precaution in regard to them had been shown by the disastrous fire in the hotel at New York. Another point needing attention was that where, as was frequently the case in the City, the lower floors were used for the storage of inflammable goods, and the upper floor as a residence for the housekeepers or caretakers, special means should be taken to make that part of the building fireproof, and it should be reached by a fireproof staircase entirely cut off from the warehouse buildings, so as to allow a means of escape in case of fire.

Mr. Arthur Cawston said that when a modern half-timbered building originally erected when there were no other buildings near it needed restoration or rebuilding, it would, perhaps, be desirable only to sanction its rebuilding when there were no other buildings erected close up to it. As to the fronts of warehouse buildings having a certain proportion of brickwork or stone to window openings, why should not such fronts, if necessary, be entirely of iron and glass? He thought that the proposal that no external wall should be used as a party-wall, except under the conditions specified in the Institute's suggestions, rather a hard one on the owner of the wall. A great incentive to the spread of fire in warehouse and factory buildings was the use of match-board lining to the walls, with the inevitable hollow spaces behind it. Such walls should always be plastered, or left with the brickwork face.

Mr. Bernard Dicksee suggested that with regard to wooden bay-windows, the County Council might be relieved of a large amount of labour if such windows were allowed to be erected on certain conditions, as, for instance, if they did not come nearer than 10 ft. to the adjoining property, or project more than 3 ft. or 4 ft. Another point that he thought might be introduced into the new Act was that District Surveyors should be given full control over the house drainage, and that it should not be left in the hands of the Vestry Surveyors. Very often the latter knew nothing of drains at all: they were mostly road men.

Mr. Hall explained that in the proposed new Act the drainage, and everything within the curtilage of the house, would be under the control of the District Surveyor.

Mr. Dicksee, continuing, said he thought that the definition of a building in the proposed new Bill was a little too all-inclusive. It seemed to him that it would include everything, from a pill-box to a cathedral. He thought it would include a tent, but he thought that the definition of a building should not cover things of that kind.

Mr. H. H. Statham said he also had some objection to offer to the definition of the term "building," but it was not the same objection as that of the last speaker. He thought that in the "suggestions" of the Institute there was some confusion between the terms "building" and "shed." A "building" was defined as including every erection comprising a cubical space defined by walls, piers, posts, or other structures, and a roof or other covering, whether such erection was wholly enclosed or not; and then, later on, it was proposed that "sheds" which were not enclosed, but which were open on one or more sides, might be erected if the roofs were covered with fire-resisting material. What was the differentiation here between "shed" and "building"? And was a "shed" only one of the varieties included under the general term "building"? As to back-to-back houses, which had been incidentally spoken of with favour by one of the speakers, he hoped they would hear no more advocacy of them in that assembly. As to fire-proof construction, he thought a little further definition was required, especially with regard to the mention of stone as a fire-proof material, for although stone would not burn, it would crack and fly. It was also worth consideration whether the use of "oak" beams might not be specified in certain positions, not merely "wooden" beams, for, on the testimony of Captain Shaw, an oak post or beam took a long time to burn through, and although it might get charred on the outside, it would not be consumed, or materially weakened under the action of fire for a long time.

Mr. J. Douglass Mathews said that, with regard to By-laws, there was great danger that they would embody various whims or fancies not at all to be desired in the interests of the public. Mr. Hall had flattered the District Surveyors by proposing to give them a great deal of discretionary power, but they (the District Surveyors) wished to be vested with as little discretionary power as possible.

Mr. Thomas Blashill said that with regard to the proportion of openings to solids in front of buildings, fronts entirely of iron and glass were prohibited because of the danger of the spread of fire. He defended the proposals of the County Council as to space in the rear of buildings, and contended that Mr. Hall's unfavourable illustration was that of an extreme case. Of course the provision of increased space was made primarily in the interests of health. With regard to the definition of the term "building," he did not see why it should not include a tent, because tradesmen and others frequently rigged up tents at the back of their premises, and used them for the storage or exhibition of goods.

Mr. John Slater said it was gratifying to him to find that many suggestions which he had made in a paper he read before the Institute two years ago had been embodied in the Institute's draft Bill. But he agreed with Mr. Statham's criticisms, especially as to fireproof construction, and deprecated the use of iron without fire-resisting casing; and he was convinced that the schedules and definitions would need much more careful consideration.

Mr. T. M. Rickman and the President having made a few remarks, Mr. Hall replied to some points raised in the discussion, and the meeting terminated.

Illustrations.

HOUSES, QUEEN'S-GATE.

THIS is an illustration showing the work that has been carried out in refronting two houses at Queen's-gate, South Kensington, after removing the stucco, cement cornices, and enrichments on the existing front. One has been recased with red brick and terra-cotta enrichments, and the other with red brick and Portland stone dressings.

Considerable structural alterations have also been made in the interior of the building. Bath-rooms, lifts, and other modern requirements have been added, and a considerable portion of the old building has been removed from the rear to give direct light into the hall and principal staircase. The stone stairs immediately in front of the entrance-door have been removed, and the hall considerably widened, with a new oak staircase approached through an oak colonnade. The hall and dining-room have been lined with a high wainscot dado. The ceilings to the principal rooms have been enriched with ribs in geometrical forms, supported by deep modelled friezes.

The kitchen has been removed from the body of the building and placed at the rear, with offices adjoining; and a large billiard-room placed in the basement, having a separate staircase from the hall.

The work has been carried out by Mr. J. Douglas, under the superintendence of Mr. Fred G. Knight, architect.

EAST WINDOW, S. MARY'S CHURCH, LEIGH, LANCASHIRE.

IN the principal lights are standing figures under canopies, with small subjects in the bases. A figure of Our Lord in Majesty occupies the centre light, and in the side lights are the four Archangels. The small subjects or scenes below bear reference to the figures above them. Thus, in the centre light is the Resurrection; below the figure of Raphael, "Tobit drawing the fish from the water at the angel's command"; below S. Gabriel, "The Annunciation to the B. Virgin"; under S. Michael is depicted his combat with the dragon; and in the fourth light S. Uriel explains to Esdras his vision. The row of traceries immediately above these lights represent the nine orders of angels, supplemented by virgins. The remaining pieces of tracery are filled with figures of prophets and angels.

The work is broadly treated, as demanded by the scale of the building and the size of the window (the principal lights being over 2 ft. in width), with large masses of silvery-white glass and simple colour. It may be noted that the wings of the Archangels, which come out so darkly in reproduction, are in a pale golden stain.* The artists are Messrs. Shrigley & Hunt, of Lancaster and London, and the drawing was exhibited in the Royal Academy last year.

DESIGN FOR A PUBLIC LIBRARY FOR A COUNTY TOWN.

IN this design, the elevations of which were hung in last year's Academy exhibition, the designer sought to get interest and effect out of the necessary features of the building rather than introduce unnecessary ones. The material was to have been red brick and Bath stone, with green slates, finished with a stone ridge. The angle turret at the corner was crowned with an oak and shingle flèche covered with copper. This turret contained the librarian's private stair, which gave him access from his flat on the top floor to the reading-rooms and reference-library on the first floor, to the lending-library on the ground floor, to the caretaker's rooms in the basement, and also into the street. The site was a corner one, with light only on two sides; the back was, therefore, lighted by a long well, and the windows in the front made as large as possible without being unsightly, and glazed with iron casement frames. A. Bartlett.

HOUSE AT WOKINGHAM.

THIS is one of three houses being built at Wokingham. Messrs. Bottrill & Son, of Reading, are the builders, and the architect is Mr. Ernest Newton. The house is built with local red bricks and tiles.

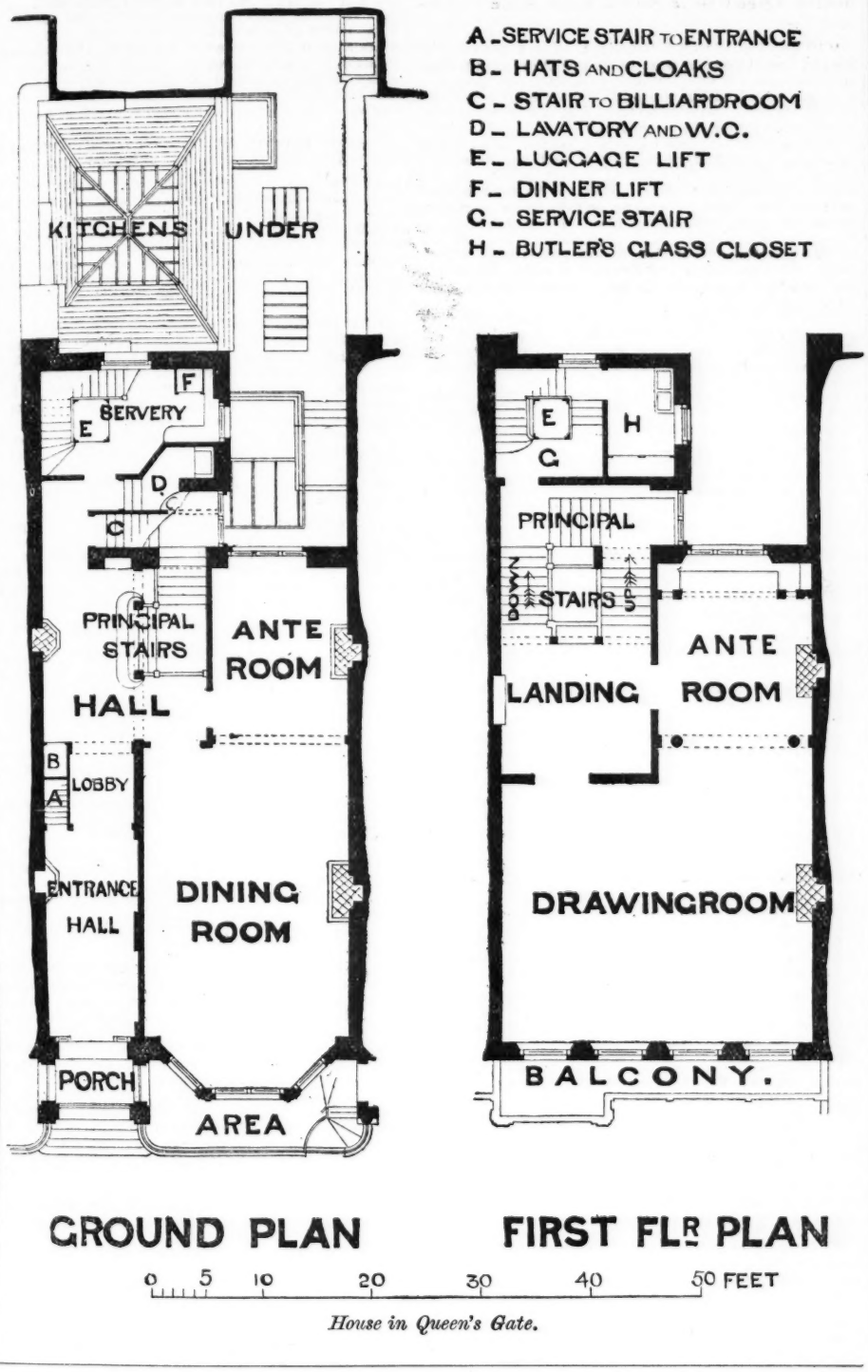
A PAINTER'S HOUSE AND STUDIO.

THIS is a design for a small house and studio; the house to contain dining-room, drawing-room, hall, offices, &c., and on the first floor, four bedrooms, bath-room, &c. There is no room over the studio. From the verandah there are doors to both studio and drawing-room, so that there should be free circulation at receptions. The approximate cost was 1,500*l*. Fred. M. Simpson.

COMPETITIONS.

CHACEWATER CHURCH, CORNWALL.—The competition for rebuilding the Parish Church, Chacewater, Cornwall, has resulted in the selection of the designs sent in by Mr. Edmund Sedding, of Plymouth. There were six sets of plans sent in for it, and various were the ways suggested for treating the hideous building, which was erected early in the present century, with accommodation for 1,500 persons. The church has for some time been closed as unfit for public worship, the roof and other parts being in a bad state, so it is intended to commence the work in March.

* All colours tending to yellow or gold are liable to come out dark in photographing.



House in Queen's Gate.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

THE METROPOLITAN LIFE ASSURANCE BUILDINGS.

THE block of buildings in Moorgate-street which has been erected for the Metropolitan Life Assurance Society, from the designs of Messrs. Aston Webb and Ingress Bell, was visited on Saturday afternoon by a large party of members of the Architectural Association, under the guidance of the Junior Honorary Secretary, Mr. F. T. W. Goldsmith, the occasion being the first spring visit of the present session. In the unavoidable absence of the architects, the buildings were carefully described by the Clerk of the Works, Mr. Warburton. These two buildings now occupy the site of three houses which have been removed. The offices of the Society occupy the basement, ground, and first floors of the corner building,* and the rest of the premises is devoted to offices, access to the upper portion over the insurance office being gained from Coleman-street, at the back. The principal point of interest is the rooms of the Society, which are fitted throughout with Spanish mahogany, the graceful design of which is materially enhanced by the high character of the workmanship. The chief office occupies the whole of the front of the corner building with corner entrances, a smaller room for committees, and two rooms for the actuary and assistant actuary, occupy the remainder of the ground floor. The first floor contains a large board room facing Moorgate-street, with doctor's and dressing-rooms, a small room, and a luncheon-room adjacent. The board-room has a low mahogany dado, and the upper portion of the wall is divided into panels by light moulded plaster ribs, and these panels are to be covered with embossed Japanese paper, which will doubtless give a rich effect. The ceiling is executed in Jackson's fibrous plaster, and the same material has been used in the vallances of the windows, of exceedingly delicate design, though the use of the material in this position is somewhat open to question. It is to be hoped that the dummy door on the left-hand side of the entrance is not really intended, and that the balance of the decoration will be maintained without resort to this old-fashioned architectural sham. The barrel-vault shaped ceiling of the staircase, gracefully modelled *in situ* received much attention. The façades of the building have been executed in Portland stone, with polished Cornish granite base, and the elaborate detail of the windows is emphasised by the deep bands of plain surface between them. The treatment effectually disguises the fact of the existence of two buildings. The dreary monotony of Moorgate-street is now broken by this interesting addition to city architecture, and it is to be hoped that this building may be followed by many more of an equally pleasing design. The general contract has been carried out by Messrs. Cubitt & Co.

A visit was then made to the tower and St. Mary-le-Bow, which is now undergoing restoration under the superintendence of Messrs. Tress & Innes. The opportunity of investigating this interesting work of Wren's was much appreciated.

* For view of the corner building see *Builder* for May 17, 1890

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE monthly meeting of this Society was held at the School of Art on Tuesday evening last, Mr. Innocent, the President, in the chair.

Mr. W. Randolph read a paper on "Town Churches, Ancient and Modern." He referred to the absence of a matured type of Town Church in Mediæval England. Our country churches were adopted fifty years ago as models for the orthodox church of the Gothic Revival. Exceptions in favour of a broader treatment were instanced in the works of Pugin and a few other architects, but no general movement was apparent till about 1850, when both the art and the literature of the Revival began to witness to the influence of foreign studies. After dealing with the brickwork and church furniture of North Germany and the Netherlands, the lecturer passed on to English precedents. The last portion of the paper was devoted to showing how the character of church work since the middle of the century had been widened under such influences as had been reviewed.

The lecture was illustrated by photos, diagrams, and sketches.

NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THIS Association held its twenty-eighth half-yearly meeting, in the rooms of the Central Association of Master Builders of London, on Tuesday, the 26th ult.

Mr. J. C. White, of Liverpool, the President, presided, and representatives from London, Liverpool, Manchester, Birmingham, Bristol, Hull, the Potteries, Cambridge, and Preston were present.

The report and accounts for the past half-year were read and adopted.

The following Officers and Council were appointed for the ensuing year:—President, Mr. J. C. White, Liverpool; Vice-Presidents, Messrs. Robt. Dennett, Nottingham, and John Bowen, Birmingham. Hon. Vice-Presidents, Messrs. Stanley G. Bird, London; Robt. Neill, jun., Manchester; and Mr. J. Howard Colls, London. Hon. Treasurer, Mr. Jos. Stevenson Jones, Liverpool. Hon. Auditor, Mr. C. W. Green, Liverpool. Council: Birmingham, Messrs. C. H. Barnsley and W. Sapcote; Bolton, Mr. Jos. Hy. Marsden; Bradford, Messrs. William Moulson and William Holdsworth; Bristol, Mr. A. Krauss; Cambridge, Mr. A. G. Bell; Derby, Mr. John Walker; Edinburgh, Mr. Thomas Bonnar; Glasgow, Mr. R. Bennett; Hull, Mr. R. Beevers; Leeds, Mr. C. Tomlinson; Lincoln, Mr. Wm. Hy. Close; Liverpool, Messrs. A. G. White and J. B. Johnson; London, Mr. Thos. F. Rider; Manchester, Mr. Wm. Southern and Alderman Wm. Brown; Northampton. Mr. W. H. Smith; Potteries, Mr. Jas. Bowden; Wigan, Mr. Chas. B. Holmes; and Wolverhampton, Mr. J. Bradney. The Presidents of the Local Associations are also Members of the Council, *ex-officio*.

Several matters of great interest and importance to the building trades were discussed, and the meeting was brought to a close by a vote of thanks to the President.

It was decided to hold the next half-yearly meeting at Newcastle-on-Tyne.

THE ENGLISH IRON TRADE. — The English iron market, although practically unchanged, exhibits a slightly improved tone. The Glasgow warrant-market is dull; but more movement is noticeable in Scotch makers' iron, with most brands showing considerable reductions. In the Cleveland market prices are stronger. The hematite pig-iron trade remains depressed. The tin-plate market is dull. Manufactured iron is only in limited inquiry. The steel trade shows little alteration; the demand for heavy sections of rails is a little fuller. Shipbuilders, with the exception of west-coast yards, are quiet. Engineers are only moderately employed; the strike on the Tyne exhibits no sign of conclusion. The coal trade is rather quiet; the Durham miners are preparing to resist the proposed 10 per cent. reduction.—*Iron*.

THE INSTITUTE OF BUILDERS.

THE eighth annual general meeting of the Institute of Builders was held at the offices, 31 and 32, Bedford-street, Strand, W.C., on Tuesday last., the President, Mr. H. T. Ashby, being in the chair.

The Secretary, Mr. Richard S. Henshaw, read the following report, which was adopted unanimously:—

"1.—The Council have the pleasure to present their Eighth Annual Report, and in so doing regret having to record the death of one of the Members of the Institute, Mr. William Henry Cowlin, of Bristol, late President of the National Association of Master Builders of Great Britain, and a Director of the Builders' Accident Insurance, Limited.

2. The building trade of the year was seriously interfered with by the prolonged strike and lock-out of the carpenters and joiners, lasting as it did for nearly six months.

3. The Council in their last Report, stated that they had appointed a Committee to consider the draft 'General Conditions of Contract,' proposed by the Royal Institute of British Architects to take the place of those formally agreed between the Royal Institute and the 'Builders' Society.' The Committee devoted much time to the consideration of the proposed Conditions, and after fourteen sittings reported to the Council, who adopted the report, and forwarded the revised Conditions to the Royal Institute. The Council are now awaiting further communications on the subject.

4. The Council appointed a Committee to consider the Building By-laws proposed by the London County Council. The Committee formulated their objections to the By-laws and in due course presented them to the Home Secretary.

5. The London Building Law (Consolidation) Bill, prepared by the Government, is now being carefully considered by the Parliamentary Committee, who will comply with the request of the Secretary of the Local Government Board to report to him the views of the Institute upon the Bill.

6. The Council have the pleasure to present the audited accounts of the Institute, and the Library and Benevolent Funds for the year 1891.

7. In accordance with the Articles of Association, the President, Mr. H. T. Ashby; one of the Vice-Presidents, Mr. Robert Neill, Junior; the Treasurer, Mr. G. Plucknett; one of the Auditors, Mr. H. J. Sanders; and four members of the Council,—Mr. John T. Chappell, Mr. W. H. Clarke, Mr. Basil P. Ellis, and Mr. Woodman Hill,—retire, but are eligible for re-election."

Mr. Herbert Henry Bartlett was elected President; Mr. R. Neill, jun., and Mr. John M. Burt were respectively re-elected and elected Vice-Presidents; Mr. George Plucknett and Mr. H. J. Sanders were re-elected Treasurer and Auditor respectively; and Mr. J. T. Chappell and Mr. Woodman Hill were re-elected, and Mr. Benjamin Hannen, jun., Mr. William Scrivener and Mr. G. Williams were elected, members of the Council.

A vote of thanks to the President for his services during the past year concluded the proceedings.

THE LONDON COUNTY COUNCIL:

NEW THEATRE REGULATIONS.

THE usual weekly meeting of the London County Council was held on Tuesday afternoon last, the Chairman, Sir John Lubbock, presiding.

Regulations for Ensuring the Public Safety in Theatres.—The Theatres and Music-halls Committee reported that, in the interest of the public safety, they had, after much consideration, drawn up a set of regulations for theatres and music-halls in lieu of those now in existence. These regulations have been framed under the Metropolis Management and Building Acts Amendment Act, 1878, with respect to the requirements for the protection from fire of theatres, houses, rooms, and other places of public resort within the administrative county of London, and are divided into three parts, viz., Part I., relating to Structural Matters; Part II., General; and Part III., Electric Lighting. It is provided that "these regulations shall, unless otherwise specified, apply to all theatres, houses, rooms, or other places of public resort within the administrative county of London, to be kept open for the public performance of stage-plays, and to all houses, rooms, or other places of public resort within the said county, to be kept open for public dancing, music, or other public entertainment of the like kind, under the authority of letters patent from her Majesty the Queen, her heirs or successors, or of licences by the Lord Chamberlain of her Majesty's household, or by the London County Council, other than letters patent, or licences which may have been granted for the first time before the passing of the above-mentioned Act." The following are the regulations relating to structural matters, in the form in which they were amended and finally agreed to, *seriatim*, after some discussion:—

"1. *Applications and Drawings.*—Every person who for the first time after the making of these regulations shall be desirous of obtaining authority to open any such premises* within the said County, shall first make an application in writing to the Clerk of the Council for a certificate under the above Act.

Such application shall contain a statement as to the nature and extent of the interest of such person in such premises, and the character of the entertainment for which such premises are proposed to be used, and be accompanied by complete plans, elevations and sections, drawn on tracing linen, to a scale of one-eighth of an inch to a foot; and by a block plan showing the position of such premisss in relation to any adjacent premises, and to the public thoroughfares upon which the site of such premises abuts, drawn to a scale of not less than $\frac{1}{50}$th of an inch to a foot.

Such drawings shall be coloured to distinguish the materials employed in the construction of the building; the width of all staircases, corridors, gangways, and doorways, together with the heights of the tiers, and other parts of the building.

The thicknesses of the walls, and scantlings of the various materials, shall be clearly shown by figured dimensions; and the cardinal points shall be marked upon each plan.

Such drawings shall be accompanied by a specification of the works to be executed, describing the materials to be employed and the mode of construction to be adopted, together with such other particulars as may be necessary to enable the Council to judge whether the requirements of these regulations will, when such premises have been completed, have been complied with.

Such drawings shall also show the respective numbers of persons to be accommodated in the various parts of such premises, and the area to be assigned to each person, which shall not be less than 1 ft. 8 in. by 1 ft. 6 in. in the gallery, and not less than 2 ft. 4 in. by 1 ft. 8 in. in other parts of such premises.

2. *Site.*—One-half at least of the total length of the boundaries of the site of any such premises which consist of an entire building, and in case of a room or other such premises not consisting of an entire building, one-half at least of the total length of the boundaries of the site of the building of which such room or other such premises form part, shall abut upon public thoroughfares, of which one thoroughfare at least shall be not less than 40 ft. wide, and of the remainder none shall be less than 30 ft. wide if a carriageway, or 20 ft. wide if a footway.

If, in compliance with Regulation No. 10, an additional passage or way should be necessary, it may be provided by means of a private passage or way.

Such passage or way shall not be less than 10 ft. in width, and under the complete control of the owner of such premises, and no doors, windows, or other openings of the adjoining premises shall communicate therewith, or overlook any portion of such passage or way.

3. *Windows overlooking site.*—No such premises shall be erected upon a site within 20 ft. of any windows or other openings belonging to any other premises overlooking the site.

4. *Walls.*—All such premises shall be enclosed with proper external or party-walls of brick or stone.

The thickness of such walls shall not be less than the thickness prescribed by the Metropolitan Building Act, 1855, for walls of similar height and length in buildings of the warehouse class.

5. *Dressing-rooms.*—Dressing-rooms shall be arranged in a separate block of buildings, or divided from the place of public resort by party-walls, with only such means of communication therewith as may be approved by the Council.

All such dressing-rooms shall be constructed of fire-resisting materials, and connected with an independent exit leading directly into a thoroughfare or way.

All such dressing-rooms shall be ventilated to the outer air by windows in the external walls.

The walls of all such dressing-rooms shall be hung, for decorative purposes, only with materials completely adhering to the surface of such walls.

No such dressing-rooms shall be situated more than one story below the street level.

Sufficient and separate w.c. and urinal accommodation, properly ventilated to the outer air, shall be provided for the use of the male and female artistes.

6. *No theatre under or over any other building.*—No theatre shall be constructed underneath, or on the top of, any part of any other building.

7. *Number of tiers.*—No such premises shall have more than three tiers or horizontal divisions, including the gallery, above the level of the pit.

Where the front seats of the gallery are separated from the gallery by a partition, such seats shall not count as a separate tier.

8. *Height of tiers.*—Where the first tier or balcony extends over the pit, stalls, or area, the height between the floor of the pit and the first tier shall not be at any part less than 10 ft., and the height between the floor of the highest part of the gallery and the lowest part of the ceiling over the same shall not be less than 12 ft.

9. *Floor of pit.*—In all such premises the floor of the highest part of the pit, or of the stalls where there is no pit, shall not be more than 6 in. above the level of the street adjoining the principal entrance to the pit, and the lowest part of the floor of the pit or stalls shall not be more than 15 ft. below such level.

10. *Entrances and exits.*—Two separate exits, not leading into the same thorcughfare or way, shall be provided to every tier or floor of such premises.

If any tier or floor shall be divided into two parts, two separate exits, not leading into the same thoroughfare or way, shall be provided to each of such parts.

Such exits shall be arranged so as to afford a ready means of egress from both sides of each tier or floor, and shall lead directly into a thoroughfare or way.

11. *Vestibules.*—Where vestibules are provided, not more than three tiers or floors (or where such tiers or floors are divided into two or more parts, such parts of tiers or floors) shall communicate with one vestibule.

The width of each vestibule shall be at least one-third greater than the united width of all the doorways or passages that lead thereto.

The united widths of all the doorways or passage that lead from a vestibule towards a thoroughfare or way shall be at least of the same width as such vestibule.

Not more than one exit from each separate part of a tier or floor shall be used as an entrance.

12. *Proscenium-wall.*—In all such premises where a stage with a proscenium shall be erected, such stage shall be separated from the auditorium by a brick proscenium-wall not less than 13 in. in thickness, and such wall shall be carried up the full thickness to a height of at least 3 ft. above the roof, such height being measured at right angles to the slope of the roof, and shall be carried down below the stage to a solid foundation.

Not more than three openings shall be formed in the proscenium-wall, exclusive of the proscenium opening.

No such openings shall exceed 3 ft. in width and 6 ft. 6 in. in height, and each of such openings shall be closed by a wrought-iron door not less than $\frac{1}{4}$ in. in thickness in the panel, hung in a wrought-iron frame, so as to close of itself without a spring.

No openings formed in the proscenium-wall shall, at the lowest part, be at a higher level than the floor of the stage.

All the decorations around the proscenium shall be constructed of fire-resisting materials.

13. *Proscenium opening.*—The proscenium opening shall be provided with a fire-resisting screen to be used as a drop-curtain, of such pattern, construction, and gearing, and with such arrangements for pouring water upon the surface of the screen which is towards the stage, as may be approved by the Council.

14. *Roof over stage.*—The height of the wall-plate carrying the rafters of the roof over the stage shall not be less than twice the height of the proscenium opening, such height being measured from the level of the stage at the curtain line.

An opening shall be formed in the roof near the back of the stage, of a superficial area at the base of at least $\frac{1}{10}$th of the superficial area of the stage. Such opening shall be covered with a lantern light, glazed on the top and sides, and be fitted with suitable exhaust cowls.

15. *Corridors, passages, and staircases.*—Every staircase, landing, lobby, corridor, or passage intended for the use of not more than 400 persons of the audience shall be formed of fire-resisting materials and shall not be less than 4 ft. 6 in. wide; but if communicating with any portion of the house intended for the accommodation of a larger number of the audience than 400 persons, it shall be increased in width by 6 in. for every additional 100 persons until a maximum width of 9 ft. be obtained.

16. *Staircases.*—Every staircase for the use of the audience shall have solid square (as distinguished from spandrel) steps of York or other stone or fire-resisting materials, to be approved by the Council, with treads not less than 11 in. wide and with risers not more than 6 in. high, without winders, in flights of not more than twelve or less than three steps each.

The treads of each flight of steps shall be of uniform width, and be pinned into brick walls at both ends.

The several flights of such steps shall be supported and enclosed upon all sides by brick walls not less than 9 in. thick, to be carried down to the level of the footways.

No staircase shall have more than two flights of twelve steps each without a turn.

All landings shall be 6 in. thick, be square upon plan, and have brick arches 9 in. deep turned under them in the middle of such landings.

Every staircase shall have a roof of fire-resisting materials to be approved by the Council.

A continuous handrail shall be fixed on both sides of all steps and landings, supported by strong metal brackets built into the wall.

Such handrails shall be chased into the walls, where the thickness of the walls will permit, but in all cases where the flights of steps re-turn, the newel wall shall be chased so as to allow the handrail to turn without projecting on the landing.

17. *Gangways.*—A clear passage or gangway not less than 3 ft. wide shall be formed at the sides and in the rear of the seating in every part of such premises.

Such passages or gangways shall at all times be kept entirely free from chairs, flap-seats, or other obstructions, whether permanent or temporary.

18. *Ironwork.*—All constructional ironwork in such premises shall be embedded in fire-resisting materials in a manner to be approved by the Council.

19. *Workshops, &c.*—All workshops, store-rooms, wardrobe or painting rooms, in connexion with such premises, shall be separated from such premises by brick walls not less than 9 in. thick.

All openings in such walls shall be closed with self-closing wrought-iron doors hung in a wrought-iron frame.

All such doors, if consisting of a single fold, shall be made to overlap, when closed, the door frame at least 3 in.; and, if made in two folds, such folds shall overlap each other, when closed, at least 3 in. on each side.

All floors and ceilings of such rooms shall be formed of fire-resisting materials.

All such rooms shall be ventilated by windows in the outer walls.

20. *Limelight tanks, boilers, and dynamos.*—All limelight tanks, boilers with engines, and dynamos with engines shall be each placed in a ventilated chamber or building of fire-proof construction.

Such chambers or buildings shall be separated from such premises, and from each other, by brick walls and fireproof floors without openings, and shall be enclosed upon one or more sides by external walls.

21. *Scene Dock.*—All scene docks or stores and property rooms in connexion with such premises shall be enclosed by brick walls not less than 9 in. thick, and shall have floors and ceilings of fire-resisting materials.

All openings from such docks, stores, or rooms to such premises shall be closed by self-closing wrought-iron doors, hung in wrought-iron frames.

All such doors, if consisting of a single fold, shall be

* In these regulations the expression "such premises" means a theatre, house, room, or other place of public resort to be kept open for any of the purposes aforesaid.

made to overlap, when closed, the door-frame at least 3 in.; and, if made in two folds, such folds shall overlap each other, when closed, at least 3 in. on each side.

22. *Enclosures.*—No enclosure shall be provided upon any such premises where the public can assemble for any other purpose than to view the performance, except so far as the Council shall consider necessary for the provision of refreshment-bars, or, in the case of a theatre, for the provision of a *foyer*, or smoking-room.

23. *Skylights.*—All skylights, and the sloping sides of lantern lights, shall be protected by galvanised iron-wire guards, securely fixed on the outside of such skylights or lantern lights.

24. *Gas.*—All such premises when lighted by gas shall have separate and distinct gas services and meters as follows:—(*a*) To the stage; (*b*) To the auditorium; (*c*) To the staircases, corridors, and exits.

Such meters shall be placed in properly ventilated chambers of fireproof construction.

All gas-brackets shall be fixed without joints; and all burners within reach of the audience shall be fitted with secret taps, and be efficiently protected by glass or wire globes.

All gas-burners within 3 ft. of the ceiling shall have hanging shades of uninflammable material to distribute the heat.

All gas-pipes shall be made of iron or brass.

Where there is a stage or wings with scenery, the footlights or floats shall be protected by fixed iron-wire guards, and the burners shall be provided with glass chimneys.

The rows and lines, and gas-burners in the wings (which must commence 4 ft. at least from the level of the stage) shall be protected by fixed iron-wire guards.

All battens shall be hung by at least three wire ropes, and be protected at the back by a solid metal guard, and wire fixed to a stiff iron frame, at such a distance from the gas-jets that no part of the scenery or decoration can become heated.

All movable lights shall be fitted with flexible tubes, and the gas in every case shall be turned off by the tap on the stage as well as by that on the flexible tube.

All flexible tubes shall be of sufficient strength to resist pressure from without.

An indicating gas-plate shall be provided at a convenient place at the side of the stage.

25. *Doors and fastenings.*—All doorways used by the public shall be at least 4 ft. 6 in. wide in the clear, with doors hung in two folds made to open outwards towards the thoroughfare or way.

All internal doors shall be so hung as not to obstruct, when open, any gangway, passage, staircase, or landing.

No door shall open immediately upon a flight of steps, but a square landing at least the width of the doorway shall be provided between such steps and such doorway.

All exit doors having fastenings shall be fastened by automatic bolts only, of a pattern to be approved by the Council; but where such doors are also to be used by the public for entrances, they shall be fastened with espagnolette or lever bolts only, of a pattern to be approved in each case by the Council, and fitted with lever handles at a height of 3 ft. 6 in. from the floor.

All doors used for entrances, and all gates, shall be made to open both ways, and shall, when opened inwards, be locked back against the wall in such a manner as to require a key to release them.

All barriers and internal doors shall be made to open outwards, with no other fastenings than automatic bolts.

No locks, monkey-tail, flush, or barrel bolts, or locking bars, or other obstructions to exit, shall be used on any doors, gates, or barriers.

26. *Ventilation.*—All parts of such premises shall be properly and sufficiently ventilated in a manner to be approved by the Council.

All openings for ventilation shall be shown on the plans, and described in the specification, which shall be submitted to the Council for its approval.

27. *Warming.*—No fireplace shall be formed in any portion of the auditorium or stage of such premises.

All open fireplaces or stoves in any other part of such premises shall be protected by strong fixed iron-wire guards and fenders, part of which may be made to open for all necessary purposes.

All heating apparatus shall be placed in a position to be approved by the Council, and enclosed upon all sides by brick walls not less than 9 in. thick, and shall be properly ventilated.

All hot-water pipes or coils shall, where necessary, be recessed in the walls, or otherwise arranged so as not to diminish the clear width of the gangway.

Where such premises are heated by artificial means, the high-pressure hot-water system with sealed pipes will be inadmissible, and either hot-air or the low-pressure hot-water circulation system shall be adopted, having an open cold-water supply cistern, and the pipes throughout the system shall be of galvanised wrought-iron, with the exception of those in immediate contact with the boiler, which may be either of galvanised wrought iron or copper.

The boiler shall be made of wrought iron, copper, or mild steel, and shall be provided with a dead weight or other approved safety-valve, which must be attached to the boiler by an independent galvanised wrought iron or copper pipe, and must not under any circumstances be fixed to the circulating-pipes, and must be placed in such a position as will ensure protection from soot and dirt.

The term low pressure shall be understood to mean the pressure due to the vertical head of water between the boiler and the supply cistern.

28. *Water supply.*—All such premises containing a superficial area for the accommodation of the public of 1,000 ft. and upwards shall be provided with a sufficient number of hydrants, each of a diameter of not less than 2½ in., to be connected by a 3-in. main with a water company's high pressure street main.

Each of such hydrants shall be provided with at least a 30-ft. length of hose, with fittings of the Metropolitan Fire Brigade pattern.

In all such premises, where there is no constant supply of water, there shall be provided on the top of the proscenium wall, or at some other place to be approved by the Council, two cisterns, to be kept always filled with water.

Such cisterns shall be each capable of containing at least 250 gallons of water for every 100 persons of the audience to be accommodated in the building.

Such cisterns shall be properly protected from all danger from frost.

Fire-mains shall be connected with such cisterns to hydrants to be fixed in such places and manner as may be approved by the Council.

29. *Addition or Alteration to Premises.*—Notice shall be given to the Clerk of the Council of any intended structural addition to, or alteration of, any such premises, in respect of which the Council may have granted a certificate under the said Act of 1878, to the effect that such premises were, on their original completion, in accordance with the Council's regulations.

Such notice shall be accompanied by plans, elevations and sections, block plan, and specification of the works to be executed similar to those required in the case of premises to be certified for the first time by the Council, and showing such intended addition or alteration.

The Council will, if necessary, cause a fresh survey of such premises to be made.

No doors, bolts or other fastenings, obstructions to the means of egress, flap seats, or other means of diminishing or stopping up the gangways, shall be put, nor shall any alterations of a like nature be made to such premises without the previous consent of the Council being obtained thereto."

Railway and other Schemes.—On the recommendation of the Parliamentary Committee, it was decided to petition against various railway and other schemes affecting the Metropolis, including the Manchester, Sheffield, and Lincolnshire Company's proposed new trunk-line to London.

Gower-street.—Amongst other recommendations of the Improvements Committee which were agreed to was one approving of an arrangement for removing the bar at the top of Gower-street, so as to open up another direct line of communication between Euston-road and Holborn. The land occupied by the roadway between University College and University College Hospital is, it seems, the property of the Hospital authorities, who are willing to sell it for 15,000*l.* The Council propose to contribute 10,000*l.* towards the cost, the Vestry contributing the remaining 5,000*l.*

After transacting other business, the Council adjourned.

Correspondence.

To the Editor of THE BUILDER.

DR. TEALE ON "DUST."

SIR,—In your article of February 6 upon my lecture at the Society of Arts upon "Dust and Fresh Air," you throw doubts upon some of the points I contended for. Upon these kindly permit me to make some comments.

1. "The windows to be formed with the greater portion fixed, and only a tall, narrow sash hinged to open as a casement, and protected in the same way as closet-doors and boxes." My proposal is,—that, in an ordinary window, one half should be fixed, the other half should open as a casement inwards, but that in the case of a wide window the two outer thirds should be fixed, and the centre third should open on hinges. The casement should not open in one tall piece, but in two portions, or even in the case of very tall windows in three portions, in order to avoid the clumsiness and inaccuracy of the ordinary fittings of French windows. This hinged window is not protected against ingress of wind and soot after the manner of drawers and closets, but by very *accurate fittings against a "double rebated frame,"* after the manner of a jeweller's case.

2. "The adoption of this principle would mean a practical stoppage of direct fresh air through open windows." Not at all. The windows can be opened whenever it is wished to have extra fresh air, as in summer, when few fires are burning, and there is but little soot in the atmosphere. But no one in London would have a window open night and day, because of the dirt and dust; whereas with the "Hardy diffuser" and screen we have virtually an open window, with most of the dirt screened off,—day in and day out, year in and year out.

3. "For the exclusion of dust from the house we think Mr. Teale's method can hardly be regarded as 'within the region of practical politics.'" Well, I can only say that I have had the system practically at work in my consulting rooms and in my lodgings for patients for several years, and that I am quite satisfied as to its value, practicability, and effectiveness. Neither is it very costly.

Let me repeat, what I said at the end of my lecture, my conviction, from long observation, that by far the most serious part of the dirt in a house consists of soot drawn in through the windows.

T. PRIDGIN TEALE.

*** Dr. Teale's letter at all events confirms our opinion that his system of complete dust exclusion applied to closets and boxes cannot be applied to houses in the same complete manner. Dr. Teale does not live in London; every architect and architectural draughtsman who works in London knows that when the drawing-office windows are opened in summer for air and coolness, there has to be a constant dusting of the drawing-board to keep it clean. Nor do we speak of summer only; windows ought to be frequently opened in winter, and then what becomes of straining the dust out? You cannot treat a dwelling-house like a cupboard or a chest.—ED.

CONCRETE FOR ARTISANS' DWELLINGS.

SIR,—Breeze from gasworks is very far from being the best material for concrete floors, especially of large span, its use being confined chiefly to short spans, with a free use of iron or steel girders. Breeze is improved,—so far as strength goes,—by washing, but it is even then too sandy and deficient in strength to make good concrete. It requires a greater proportion of Portland cement than many other aggregates to make, in comparison, concrete capable of withstanding moderate tensile and compressive strains. Where the materials are of a suitable nature, floors of 12 ft. to 20 ft. span may be constructed in one slab, but a judicious use of iron or steel girders, and spans of 10 ft. or thereabouts,—if the floors are quite flat on the under side,—are the best to adopt in a general way.

Breeze is not a good aggregate for walls, and assuming it was obtainable for nothing, would, if measured by strength, be probably the most costly of any in use.

As there appear to be conflicting opinions with regard to the susceptibility of deal floors laid on concrete to dry-rot, I have sent you a piece of deal, half an inch in thickness, which formed part of a cottage floor nailed down to concrete nearly eight years ago, and which is as sound now as on the day it was fixed. The advantage of nailing floor-boards to the concrete, beside that of no intervening space for mice and other house pests, is, that much thinner flooring is required, for it is well-known that if supported on joists 12 in. apart, a floor is unsafe when it is worn to about half an inch in thickness, but if laid on solid concrete, the whole thickness is available for wear. The great point is for the concrete to be thoroughly dry before the boards are nailed thereto, but it takes a long while,—months, indeed,—to arrive at a fit condition to case with wood.

My own experience points to forming the mass of concrete at the earliest opportunity, leaving about 1½ in. or 2 in. in thickness of coke breeze (or fine crushed or broken soft brick débris, screened through a half-inch sieve, is quite equal thereto when breeze is unavailable), to be laid down at last and carefully levelled. Even this should have a month allowed it to dry, and be exposed to all the wind and air possible, not covered up, as "Another Surveyor" suggests, which not only retards the concrete from drying, but saturates the wood flooring.

THOMAS POTTER.

Alresford.

SIR,—I cannot see how the 1-in. space, which "Experience" recommends between the floor-boards and the concrete, is to be properly ventilated on the upper floors of an ordinary building. The imperfect jointing of the floor-boards is, of course, what would actually ventilate this space in many cases; but we have no right to trust to this. A few years ago I saw dry rot break out on the upper floors of a building where something like a 6-in. space had been left. The upholsterer had bordered the rooms with linoleum, and the margins went wrong in about three months.

I do see, and have felt for many years, that a layer of either one or more inches of what must be very dirty air is a nasty dangerous thing to live over. You, Sir, dealt with this most trenchantly in your paper at the Health Congress last year, and my heart went out to you for exposing one of my pet horrors; a horror from which hardly any house is free. Our noses are all night long within about 2 ft. of the abomination. Supposing it possible to ventilate the space, it still remains a "run" for vermin and a home for microbes of every sort.

"C. F. M." seems to have gone nearer than anyone else to ridding us of this danger. His 2-in. screed of coke breeze and cement seems to me excellent. Nails can be driven everywhere into it, ordinary inch floor-boards can be used instead of 1½-in. wood blocks (which, spite of all efforts to the contrary, give trouble from shrinkage and absence of nails), and the dirty, stagnant, stratum of air disappears.

I wish the London School Board would give "C. F. M.'s" plan a trial in a few of their buildings. A five-years' test in an isolated case is not entirely sufficient.

Of the combustible character of coke-breeze concrete, I have had, as I stated, ocular evidence. The layer of coke breeze and cement had been carried into the fireplaces, and became almost red hot from the heat of an ordinary fire. The heat travelled *vid* the coke breeze through a 9-in. brick

back, and made havoc with the decorations in the adjoining room, the paint becoming completely frizzled. Luckily, the skirtings were of cement. So hot was the concrete that, after taking out the stove, nothing could be done for several hours; the concrete would not cool down! It seems to me a farce to call coke and cement fireproof.

"Experience" says that ballast concrete is not fireproof,—and that it is even less so than is the coke mixture. But can he quote any instance in which the latter has been put to the test of a big fire? And is it not well known that the former was so tested at a serious fire in the Borough some few years ago, and that it gave admirable results?

I know Wright's fireproof fixing blocks, having introduced them into quite a dozen buildings. They are much better than wood bricks; they do not shrink; and will, of course, resist fire for a very long time where the wood bricks would not. Did "Experience" ever try how one of these fireproof blocks behaves in a fire? A friend of mine, who received a sample block, had the curiosity,—cruelty, I had almost said,—to put it in the fire, and thus made both fuel and fun of it. Nevertheless, I think them very good things indeed in the right place,—not in the fireplace.

Of course I did not advise that the floor-boards be "cut down" until the concrete was practically dry. What I meant was, that they should be cut down at that stage, and nailed down as late as possible.

"Experience" advises coke breeze instead of coke for the "aggregate." The scaling off, about which I wrote, occurred where coke breeze had been so used.

"Experience" suggests keeping the layer 1 in. down to prevent such scaling. But this means either adding 1 in. to the layer of stagnant air above the concrete, or of making the concrete 1 in. thicker than is actually necessary for strength.

I do not like battening the soffit, but for a good job,—a richer job than artisans' dwellings,—I should always batten and lath, whatever the concrete; in no other way that I have seen can a fireproof building hope to be at all sound proof. I am afraid, Sir, that when the absolutely solid floor comes into general use our clients will still not be happy, but will say that they preferred the risk of their old condition to living in a sort of drum, upon which every passing footstep overhead beats a tattoo. "ANOTHER SURVEYOR."

February 8, 1892.

MATCH-BOARDING ON NEW BRICK WALLS, AND OAK-BLOCK FLOORING ON CONCRETE.

SIR,—I should be much obliged if any reader would tell me, through the medium of your columns, how long a time should be allowed to elapse before putting match-board lining on new brick walls built in the winter months. The match-boarding is to be kept 1 in. from the brickwork, with perforations to admit air.

Also, how long a time is required for a bed of Portland cement concrete, 6 in. thick and laid on the ground, to become thoroughly dry and fit to receive oak-block flooring? INQUIRER.

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

VII.

WATER SUPPLY (*concluded*). DIRT IN BOILERS AND PIPES. (HORTICULTURAL WORKS.)

THE necessity for a dip or siphon in the cold-supply pipe was pointed out in the last paper, and it was shown how it was effected by merely carrying the service down a few inches below the circulating pipes and then ascending into the under side of the return. This is the most simple way, but does not give very easy access to the dipped part of the pipe if it gets stopped with dirt, as it is likely to do. Some, therefore, prefer to set the pipe as fig. 23; this answers the same purpose and just as effectively, and it is frequently suggested that a plug be put at the point marked *, so that any deposited matter may be easily removed without disconnection of the pipe. This is especially desirable for those works which are fed with surface water.

Occasionally the two methods of dipping the pipe are resorted to as fig. 24. There is, however, but rarely occasion for this.

A very useful appliance for small apparatus is an expansion box end, as fig. 25. This is put at the extremity of the pipes furthest from the boiler, the flow and return being connected at the points shown. This article fulfils the duties of a supply cistern, a siphon (the connecting-piece which unites the flow and return at their furthest extremities) and a substantial support for the pipes. These expansion boxes are now made in a variety of sizes and styles, but the one here shown, by the enlargement at the top, admits of a ball-valve being fitted within it, if needed. It should have been mentioned that this appliance also does away with the necessity of an air-pipe that would be otherwise required at that point.

The point at which the cold-supply pipe (from a cistern) is connected into the apparatus is generally near the boiler into the return service. It does not matter much where it is situated, if the apparatus is heating a conservatory or any glass-house without divisions; but

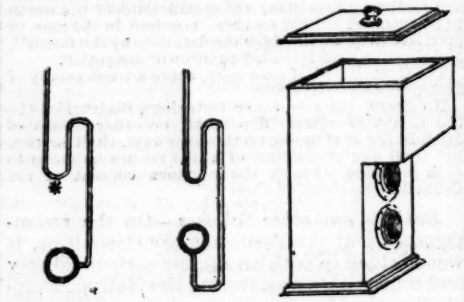


FIG. 23. FIG. 24. FIG. 25.

when there are two or several houses heated from one boiler, the cold supply must be kept near the boiler, as otherwise, in shutting off the circulation from one or more of the houses, we should possibly shut off the water-supply as well, and this would not do.

When means are provided for drawing warm water from the apparatus for watering purposes there must also be some arrangement for automatic self-filling, as it would cause a great deal of trouble to replenish by hand every time the tap was applied to. No doubt this is done sometimes, but the more usual practice is to introduce a ball-valve into the supply cistern, assuming there is a storage cistern somewhere that will furnish the required quantity. If surface water is used, dipped from a pond or ditch, then the ball-valve and automatic replenishment will probably not be feasible. Of course, warm water for watering purposes need not necessarily be drawn from the apparatus, and there are a number of gardeners, if not the majority, who are averse to it. In drawing water it naturally follows that the pipes are cooled down somewhat by the bulk of cold water that is introduced, and this is an objectionable feature, although care may be used only to draw water in the warmest hours of the day (winter day). A common means of providing warm water is to carry one or two pipes through a tank, and so heat its contents. There is no objection to this method, for although the water in the tank may take a good while to heat, and have a cooling influence upon the apparatus in the first instance, there is but little expenditure of heat when once it is all heated.

It is necessary to notice one particular feature that is manifested when water is regularly withdrawn (which means the frequent changing of the water in the apparatus), and this is the accumulation of incrusted lime deposit that occurs when hard water is used. In the usual way it is soft water, rain-water, collected in tubs or in ponds or ditches, that is supplied to the apparatus, particularly in country places; but in towns, and also when a ball-valve is used, the water supply is generally from a water company's mains. In the southern half of England the water furnished from this source is almost invariably what is known as "hard," that is, having lime in solution. The lime thus held in a dissolved state within it is, as a rule, due to the water having originally come from or through chalk strata, and, far from being noticeable, the water is usually conspicuous by its clearness and crystal-like appearance.

This lime or chalk matter (calcic bicarbonate), so soluble in water, is, as before mentioned, quite invisible and unnoticeable to the eye, but when the water is heated, a change in the state of the lime is effected, and instead of being in the fluid or gaseous state just referred to, it, by losing carbonic acid, is at once converted into a visible, hard, and solid substance (calcic carbonate), a sort of limestone. The amount of this substance obtained by heating one charge of water in the apparatus would be scarcely perceptible, and the heating and re-heating of the same water would never result in giving us more; but if the water is changed,—that is, new water introduced,—we get another precipitation of lime deposit when it is heated. By the time the water has been changed a great number of times the accumulated matter will have become, perhaps, ¼ in. or ⅓ in. in thickness, and unless it be soon removed a fracture will occur in the boiler-plate. The fracture is brought about by the deposit, which is generally very dense and hard, keeping the water away from the iron, and the boiler-plate perishes by the action of the fire. The action of the fire has no ill-effect while water is directly in contact with the opposite side of the boiler-plate; but it has, as every one knows, a rapidly destructive effect upon iron-plate that is unprotected.

It is necessary to speak of this peculiar result with hard water, when water is drawn from an apparatus causing the contents to be frequently changed, for the deposit must one day become of sufficient thickness to do harm if not removed. When it is known that water is going to be drawn from an apparatus, it is usual to order manlids of a proper size and number for the removal of this hard scale, for it may need a tool to be inserted to loosen it, even if an anti-incrustation fluid be used when cleaning it out.

In the worst of cases, however, the hard deposit trouble never assumes the state in these works that it does in domestic supply boilers, for when using these in hard water districs, we get a ½-in. deposit of "fur" in three to six months; and frequently a boiler will crack, from this cause, within a year, if it is not cleaned out. In horticultural works,—and, in fact, all heating works,—it is best to do without drawing water from the apparatus (except for the periodical emptying and cleaning) if anyway possible.

In concluding the subject of water supply, it remains to be explained that with an apparatus from which no boiler is drawn it is not generally recommended to use a ball-valve to the supply cistern with the view of automatically replenishing the loss of water by evaporation. The quantity of water lost this way is really very small (unless the apparatus happens to be a rather extensive one), and consequently the services of the ball-valve are in very little request. This usually results in it becoming stuck or out of gear by mere want of use,—a weakness that these articles are subject to. Of course, a ball-valve can be used, if looked to now and again, but it must not be implicitly relied upon.

It will be gathered from the information given that the use of surface water, whatever care be used, introduces a deal of dirt matter into the apparatus, and this must be removed periodically. Its removal from the boiler is very necessary, as when in sufficient quantity it will bring about the destruction of the boiler-plate, in almost the same way as the hard deposit just referred to.

In a saddle-boiler, which has but one return-pipe entering it at the side, there will always be found a collection of dirt at the bottom, on the side opposite to that which the return-pipe enters. This, it will be understood, is due to the rapid movement of the water keeping the dirt clear at the point where it flows into the boiler, but it thus causes the collection to settle and form on the opposite side, where the action of the water is less strong. When a saddle-boiler has but one return and is fed with water from impure sources, the fracture, when it takes place, will almost always be at the point just explained, and that part of the boiler will be found choked up with dirt.

The dirt will also settle in pipes that are run horizontally; the more horizontal they are the easier for the dirt to rest within them; and the lowest pipes may be expected to have the larger share. This dirt is removed by a periodical flushing of the apparatus, and this suffices for all general purposes, as it is not so inclined to cake and become hard in the pipes as it does in the boiler with the fire acting upon it. Provision is made for this flushing when setting the boilers; pipes being connected into low points of the boiler, which not only admit of the issue of the water flushed through, but also admit of a cane or other instrument being passed in to disturb any sedimentary matter in the boiler that may not yield to the flushing process.

BIRMINGHAM ENGINEERING STUDENTS.—A meeting of the Association of Birmingham Students of the Institution of Civil Engineers was held on the 4th inst. at the Midland Institute, the President, Mr. J. Edward Willcox, A.M.Inst.C.E., being in the chair. A paper was read by Mr. T. Rooke, Student Inst.C.E., "On the Design and Construction of Dynamos," which was followed by an interesting discussion.

OBITUARY.

MR. M. H. BLANCHARD.—We regret to hear that Mr. M. H. Blanchard, formerly of 74, Blackfriars-road, London, terra-cotta manufacturer, died on the 1st inst., at his residence, Bishop's Waltham, Hants, after three days' illness, of influenza. He was one of the earliest revivalists of terra-cotta, and obtained the prize medal of the 1851 Exhibition for material and workmanship in terra-cotta. He carried out some of the most extensive terra-cotta works throughout the country, including, we believe, the South Kensington Museum and the Horticultural Gardens. His latest novelty was a terra-cotta staircase and floor, which were tested by fire on December 17 last, with satisfactory results, under the circumstances detailed in the *Builder* for January 2 last, p. 18. Mr. Blanchard was born November 9, 1816. His remains were interred on the 5th inst. at Norwood Cemetery.

GENERAL BUILDING NEWS.

PROPOSED RESTORATION OF LICHFIELD CATHEDRAL.—On the 3rd inst. a public meeting, convened by the Dean and Chapter, was held in the School of Art at Lichfield to consider the subject of the needful restoration of Lichfield Cathedral. The Dean and Chapter a short time ago issued an appeal asking for nearly 20,000*l.* for this purpose. About 80,000*l.* has, in past years, been expended on the renovation of the Cathedral, but other repairs remain to be taken in hand, and that without delay, says the *Lichfield Diocesan Calendar*, if the fabric is to be maintained, in some places with safety, in others in its integrity. These are as follows, and they are stated in the order of the urgency with which they are required to be executed:—(*a*) Structural repair in central tower and spire, parts of which are in such a state as to threaten their stability. (*b*) Resetting of glass in two windows, with new mullions, and repair of buttresses in Lady Chapel. (*c*) Restoration to original design of buttresses in south transept, with repairs urgently needed. (*d*) Renovation of north transept, with fresh windows as originally constructed. (*e*) Repairs of parapets and clearstory in the choir and Lady Chapel. (*f*) Repair of north aisle of nave, and other like work elsewhere. Besides these repairs, which press for attention at the very earliest opportunity, the raising of the roofs to the original pitch has been urged by the architect, Mr. J. O. Scott. This alteration, which would not in the least degree, it is stated, interfere with the beautiful groining as seen from the inside, would involve probably a further outlay of about 5,000*l.* But besides these external reparations, some outlay in the interior is almost a necessity. A reredos of lasting material, probably of mosaic, ought to be placed in the Lady Chapel; the two western windows in which require to be filled with stained glass in some degree corresponding to the beauty of the other seven. The present doors, fixed inside the three main entrances for keeping out draughts, are hardly such as befit the dignity of a cathedral. Proper fittings are required for the prebendaries' vestry and sacristy; and the present muniment-room would amply repay the cost of opening out its fair proportions. The nave also ought to be seated throughout with oak benches, of the same character as those which are already provided in the front. The Rev. Canon Lonsdale having entered into a detailed explanation of the work required to be done, Colonel T. J. Levett proposed:—"That this meeting having had brought before it the present condition of the fabric of Lichfield Cathedral, and the urgent necessity of undertaking its repair, desires to express its earnest hope that the appeal issued by the Dean and Chapter for this purpose may be liberally met throughout the diocese and elsewhere, and pledges itself to do the utmost to support the effort about to be made." The resolution, having been seconded, was carried unanimously. Over 1,000*l.* was subscribed in the room.

NEW SCHOOLS, COLLEGE OF SURGEONS, DUBLIN.—On the 1st inst., the new schools which have been built in connexion with the Royal College of Surgeons, Stephen's-green, Dublin, were opened by the President of the College, Dr. Croly. The schools constitute a new wing at the rear of the College, and include a dissecting-room, a smaller dissecting-room for lady students, a chemical laboratory, and a lecture theatre. The architects were Sir Thomas Deane & Son, and the work was executed by Messrs. H. & J. Martin. The principal dissecting-room is 74 ft. in length by 64 ft. wide and about 22 ft. in height. The roof, of which the central portion is higher and is glazed, is supported by metal columns and beams; it is composed of asphalted concrete, and is fireproof. The floor is of concrete asphalted, and is also fireproof. The ladies' dissecting-room is about 30 ft. square. The chemical laboratory is 64 ft. by 28 ft. All the rooms are provided with electric lamps supplied by the Electric Engineering Company of Ireland, and are heated by hot-water pipes supplied by Messrs. Musgrave, of Belfast. There is also a bone-room, in which specimens of human bones are preserved for purposes of study, and a lift extends through the rooms by means of which the dead subjects are raised from a cellar below.

NEW FREE CHURCH, NEAR EDINBURGH.—A new church, to be called the Restalrig Free Church, has just been erected at Parson's-green, on a triangular gusset of ground between the Portobello and Willowbrae-roads. The church has been designed by Messrs. Sydney Mitchell & Wilson, and is in the Early Gothic style. Its length is 100 ft., its breadth 25 ft., and the axis is placed east and west. There being a rapid fall of the ground to the east, advantage has been taken thereof to construct a hall under the main building capable of holding 300 people. The church consists of a nave and aisles, transepts, and chancel. Externally, at the north-east angle, is an oblong tower, with corbelled parapet, over which rises a hexagonal spire. The entrance is placed in a narthex, at the west end of the building, and above it is a six-light window, with pointed lancets and cusped circles. In the transepts the windows consist of five simple lancets grouped under an arch; the aisle windows are small with square heads; and the clearstory range consists of two-light windows arranged in pairs. The chancel is lighted from the south side by a window of the clearstory order. The church is built of red Corsehill stone, and the columns of the nave bays and the sides of the windows are of the same material. The internal walls are plastered and painted,—the upper part of yellowish-green and the under a dull red. The roof is of timber, practically of open construction; the pews are of pine. The aisles, separated from the nave by four bays, are not seated, being used solely as passages. There are no galleries. The chancel is separated from the nave by a carved wooden screen. The lower walls of the chancel are draped with deep blue hangings; on the upper portion the mural decorations are in the same tints as the rest of the church. The pulpit, an octagon of carved wood, is placed at the south angle of the chancel. The church is seated for about 600 people. The heating is accomplished by means of high-pressure hot-water pipes; and the artificial lighting by wrought-iron gas coronæ hung from the centre of the nave-roof. In the transepts and chancel there are wrought-iron wall brackets. The bust of the late Mr. Smith, who left funds to defray the cost of the building, has been executed in marble, by Mr. D. W. Stevenson, sculptor. The church has cost about 5,700*l.*

MISSION CHURCH, WESTBURY-PARK, BRISTOL.—On the 6th inst., the Dean of Bristol (Dr. Pigou) laid the foundation-stone of a new mission church at Westbury-park. The proposed building will consist of a nave 32 ft. wide and four bays in length, and will provide accommodation for 250 people. The style is to be fourteenth-century Gothic, and the principal feature will be the east window, which will be traceried. The building will be of brown Pennant with freestone dressing, and Broseley tiles will be used for the roof. The side walls will be low, so as to have a high-pitched roof. The church will be heated with hot-water pipes. Provision is made for an extension of the building by the addition of three more bays, and when this is done accommodation will be provided for 500 persons. There will also be a timber porch and a bell-cot added when the extension takes place. The architects are Messrs. Crisp & Oatley, of Bristol.

UNITED METHODIST CHAPEL, ILLOGAN, CORNWALL.—The new United Methodist Free Church which has been recently erected at Paynter's Lane-end, Redruth, and which was opened on the 3rd inst., stands on a site at the junction of roads leading from Redruth, Pool, Illogan, and Tehidy. The site is the gift of Lord Robartes. The building is in the Romanesque style. The outside measurements are 40 ft. in width by 62 ft. in length, and 27 ft. in height from the floor to the crown of the semi-circular ceiling. The front is of Plymouth limestone, with granite dressing, and the principal features in the design are three deeply-recessed arches supported on pilasters. Under the centre arch there is a bold geometrical window of granite, and the entrance-doors, with circular windows over, are in the other recesses; the pilasters and arches are also continued around the sides of the building. The seats are arranged in amphitheatre form, and accommodation is provided at the orchestra end for a large choir and also for an organ, and on either side are vestries for minister and choir. The orchestra is spanned by a moulded segmental arch supported on Corinthian pilasters, the mouldings and pilasters being continued the whole width of the end. The orchestra end is lit by two circular-headed windows, and a quatre-foil. The ceiling is segmental, springing from a cornice and frieze moulded into panels. The pews are of red deal framing and pitch-pine standard ends and panelling. The rostrum and orchestra front are of pitch-pine and mahogany. The main entrances open into lobbies, with tiled floors and pitch-pine screens. The cost of the work is about 1,000*l.*, and it has been designed and superintended by Mr. Sampson Hill, architect, of Redruth. The contractors are Mr. W. H. Moyle, of Chacewater, for carpentry and joinery, and Mr. W. H. Gray, of Illogan, for the masonry. The windows of front and orchestra are of cathedral glass, in lead lights, made by Messrs. Solomon & Co., of Truro.

SANITARY AND ENGINEERING NEWS.

SANITARY ASSURANCE ASSOCIATION.—The eleventh annual meeting of this Association was held on the 8th inst., at the offices, 5, Argyll-place, W., the President, Surgeon-General Cornish, C.I.E., in the chair. Mr. Joseph Hadley, secretary, read the annual report, from which we quote the following:—"The properties inspected and certified during the year have as usual been of the most varied character, and the Council has again to report that in no case of first inspection has the sanitary condition been such as could be certified without alteration, though there is evidence on every hand of continued improvement, and with newly-built property fewer alterations have to be insisted on before granting sanitary certificates." The balance-sheet showed that the income of the year had been 464*l.* 3s. 8d., and after meeting all liabilities a balance was carried forward.—On the motion of the President, seconded by Mr. Andrew Stirling, the report was unanimously adopted.—Surgeon-General Cornish and Mr. Henry Rutherfurd, barrister-at-law, were re-elected members of the Executive Council. The President was re-elected, and Sir Joseph Fayrer, K.C.S.I., M.D., F.R.S., and Professor Roger Smith were re-elected vice-Presidents.

RAWDON SEWERAGE.—A Local Government Board inquiry was held by Colonel Ducat, R.E., on the 27th ult., into the application of the Rawdon Local Board for the issue of a provisional order to take land compulsorily for sewage disposal purposes. There was opposition from the owners of the land. It is proposed to sewer the whole district of the Rawdon Local Board, and purify the sewage by chemical precipitation, followed by filtration through land. The area of land required to be taken is 16½ acres. The cost of the works is estimated at from 8,500*l.* to 10,000*l.* Mr. W. H. Radford, of Nottingham, is the engineer of the scheme.

FOREIGN AND COLONIAL.

FRANCE.—Messrs. Dutert, Raulin, Boitte, Formigé, Nénot, and Ancelet have been appointed by the Académie des Beaux-Arts as jurors for the Prix de Rome competition of this year.——M. Hardy, Diocesan architect at Cambrai and Nancy, has been appointed Diocesan architect at Limoges in place of the late M. Bailly.——The Société Centrale des Architectes has appointed five members as a Committee of research to study the best lines on which to require a diploma for persons practising architecture.——It is announced as almost certain that the Opéra Comique will shortly be rebuilt on the former site of the Salle Favart, burned a few years ago. The scheme will be submitted to Parliament, and can be commenced in two months if approved.——The scheme for the Metropolitan Railway is to be submitted to the Chamber of Deputies early in March.——The death is announced of M. Alfred Arago, son of the celebrated naturalist, at the age of seventy-seven. He was a pupil of Paul Delaroche, and from 1841 to 1852 exhibited various historical paintings. In the latter year he was attached to the Government as "Inspecteur Général des Beaux-Arts," and became a "Chef de Division des Beaux-Arts" in 1870.——The Civil Tribunal of the Seine has given its judgment in regard to the Meissonier dispute, and has pronounced for the division of his works among the inheritors, and against their sale.——The new Hôtel des Telephones at Guttenberg is shortly to be opened. The building is entirely constructed of brick and iron.——The well-known pavilion at Saint Adresse, near Havre, successively inhabited by Alphonse Karr, Alexandre Dumas, and Victor Hugo, is in course of demolition.——M. Lambert, the sculptor of the Voltaire statue at Ferney, has offered to execute gratuitously a bust of Louis Favre, the engineer of the St. Gothard Tunnel works. It will be erected at Geneva, opposite the post-office.——A dispute arose last year between the Bishops of Verdun and Saint Dié, about the Joan of Arc monument. The former wished the heroine to be glorified at Vaucouleurs, which is in his diocese, while the latter wished it to be at Domrémy, in his diocese. They have come to an agreement at last on the understanding that there should be a Joan of Arc monument in each town.——The Académie des Beaux-Arts proceeded to the election of a successor to M. Alphand. M. Lafenestre was elected by 20 votes out of 38, M. Michel had 9, M. Georges Berger 6, M. Corroyer 2, and M. Philippe Gille 1.——A competition is to be opened for the pictorial decoration of two new rooms in the Hôtel de Ville at Paris, adjoining the Galerie des Fêtes.

SWEDEN.—The funds accumulated for the building of the new Swedish Houses of Parliament now amount to 300,000*l.*——An aquarium is to be built in Stockholm at a cost of 2,000*l.*——The designs for the new Opera House to be built in Stockholm have been approved by the Crown authorities, some slight alterations having been made in the plans for reasons of greater safety.——Arrangements are being made for the building of a new theatre at Carlstad, at a cost of about 5,000*l.*——A German

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
Public Hall and Offices, and Enlarging Market, Abertillery, S. Wales	Mr. Baker	25 guineas	Feb. 17
*Cemetery Buildings	Northfleet Loc. Bd.	15*l.* 15*s*	Mar. 2
School Buildings	Goole Sch. Bd.	50*l.*; 20*l.*	Mar. 7

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
Water Supply Works	Belper R.S.A.	Robert Argile	Feb. 16
Sewerage Works	Walker Local Board	T. W. Laycock	do.
Additions to "Pump House" Hotel, Llangammarch Wells, South Wales	.....	T. P. Martin	do.
Dule Room, Asquith Bottom Works, Bowerby Bridge	.....	S. Wilkinson	do.
Sewerage Works, Dearne Valley	Barnsley Twn Council	J. H. Taylor	do.
*Roadmaking and Paving Works	Bromley Local Board	*Official*	do.
Road Materials	Tynemouth R.S.A.	John Waters	Feb. 17
Repairing Bridges and Road Works	Elgin County Council	H. J. Mackenzie	do.
Additions to Coxlodge Schools	South Gosford (Newcastle-on-Tyne) Sch.B.	W. Lister Newcombe	do.
*Removal of House Refuse	St. Pancras Vestry	*Official*	do.
*Works and Materials	St. Marylebone Vestry	do.	Feb. 18
*Broken Stone, Kerbs, &c.	do.	do.	do.
*Collection, &c. of Dust, Ashes, &c.	St. George-in-the-East Vestry	do.	do.
Two Cabmen's Shelters	Cardiff Corporation	do.	do.
Boarding House	Falmouth Hotel Co. Lim.	Silvanus Trevail	do.
Farmhouse, Wester Elchies, N.B.	Cameron & Allan	.....	do.
Iron Castings	Halifax Corporation	T. Holgate	do.
*Painting Schools, Banstead	Kensington & Chelsea Sch. Dist. Managers	*Official*	Feb. 19
Additions to Memorial School, Hedley, near Chester-le-Street	.....	J. W. Rounthwaite	do.
Heating Apparatus	Longton Town Council	J. W. Wardle	Feb. 20
Pair Double Cottages, Albert-street, Dufftown, N.B.	.....	D. McKay	do.
*Union Offices, Board-room, &c.	Croydon Union	F. West	Feb. 22
Villa, Grantown, Elgin, N.B.	Capt. Grant	Geo. Sutherland	do.
New Road, Keynsham, Bristol	Keynsham Union	John Mackay	do.
*Paving New Street	Camberwell Vestry	*Official*	do.
*Supply of Road Materials	do.	do.	do.
*Works and Materials	do.	do.	do.
*Works to Sewers and Drains, &c.	do.	do.	Feb. 23
*Free Library	West Ham Council	Lewis Angell	do.
*20,000 tons Lime	LondonCounty Council	*Official*	do.
*Roadmaking and Paving Works	Willesden Loc. Bd.	O. Claude Robson	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Sewerage Works	Maidstone U.S.A.	W. G. Scoones	Feb. 23
Sewerage Works, Brislington	Keynsham R.S.A.	Francis Fox	do.
*School Buildings	Kingston-upon-Hull School Board	W. Botterill	Feb. 24
*Repairing, &c. Police Stations	Receiver for Metropolitan Police	*Official*	do.
Paving and Road Works	Cardiff C. C.	W. Harpur	do.
*Erection of Schools, near Romford	Hornchurch Sch. Bd.	C. Allam	do.
*Alterations, &c. to Board's Offices	Mile-End Old Town Guardians	C. F. Burden	Feb. 25
*Works and Materials	Vestry of St. Mary, Islington	*Official*	do.
*Public Elementary Schools	Brighton, &c. (U.D.) Sch. Bd.	T. Simpson	do.
*Making-up Roads, &c.	Walthamstow L. B.	G. W. Holmes	Feb. 26
*New Parochial Offices	Battersea Vestry	E. W. Mountford	do.
Widening Finkle-street	Carlisle Corporation	W. Howard Smith	Feb. 27
*Works and Materials	Mortlake Dist. Highway Board	H. Richards	Feb. 29
*Works and Repairs to Foot and Carriageways	Limehouse B. of W.	*Official*	do.
*Works, Materials, &c.	Kensington Vestry	do.	do.
*Wagon and Carts	Vestry of St. Mary, Islington	do.	do.
*Hose, Stand-pipes, Tools, Hand-carts, &c	Toxteth-park L. B.	John Price	do.
*Asphalte Works	Edmonton Loc. Bd.	*Official*	Mar. 8
*Wrought-iron Fencing	Boro' of West Ham	do.	do.
*Completing Stores, Dwelling-house, &c. Convalescent Home, Penzance	.....	C. Dunch	do.
*Cemetery Chapel, Lodge, &c.	T. B. Bolitho	O. Caldwell	Mar. 9
*Making-up Roads	Tring Local Board	W. Huckvale	Mar. 21
*Alterations, Repairs, &c. to Schools	Chiswick Loc. Bd	*Official*	do.
Congregational Sunday School, Lightcliffe, Bradford	London Sch. Bd.	do.	No date
Vicarage, St. Thomas, Swansea	.....	T. Barker	do.
*Three Houses and Shops, Lee Green	Rev. Wm. Evans	J. B. Wilson and G. Moxham	do.
	.....	.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Surveyor	Banbury & Bloxham Highway Board	150*l.*	Feb. 17
*Assistant in Boro' Surveyor's Office	Colchester U.S.A.	Not stated	Feb. 19
*Clerk of Works	London Sch. Bd.	150*l.* rising to 250*l.*	do.
*Engineering Assistant	Toxteth Park L. B.	2*l.* 10*s.*	do.
*Assistant Surveyor	Kettering L. B.	100*l.*	Feb. 23

Those marked with an Asterisk (*) are advertised in this Number. *Competition*, p. iv. *Contracts*, pp. iv., vi., viii., & ix. *Public Appointments*, p. xx.

architect, Herr F. Seeselberg, of Veersen, has obtained official sanction to prepare plans, &c., of the Cathedral of Lund, and of two other old churches in the province of Scania. —— A monumental chapel is to be erected at Filipstad over the remains of John Ericsson, the famous inventor, the Swedish Riksdag having voted 1,100*l.* for the purpose.—— The Stockholm Building Board has elected Colonel A. M. Lindgren its chairman for the current year. The board is most active in enforcing its new regulations. The other day a builder was prohibited, through a report of the Sanitary Board, from letting a house that had not been dried for the stipulated time. ——The board of the Academy of Arts to be built in Stockholm has submitted the designs for the building prepared by Professors Dahl and Grundström, and Messrs. C. Möller and E. Lallerstedt, to the Government for approval. The principal façade shows a lofty, imposing, central structure, with two lower wings, rising from a terrace approached by a monumental flight of steps. As regards the interior, the chief consideration has been the exhibition-rooms and the hall for teaching. On leaving the flight of steps referred to, a gallery is entered running right through the transverse section of the building, intended for the exhibition of sculpture, behind which is a smaller one for the same purpose, covered with a glass roof. On both sides of this hall are situated open courts, upon which abut other exhibition rooms, ateliers, and the hall for teaching. There are in all fourteen exhibition rooms, whereas in the old building there are only two. The great festival hall will be situated on the second floor.——Some more stringent regulations than the present are to be added to the Stockholm Building Regulations, with the object of affording greater protection to men at work on the roofs of houses. Larger and stronger footboards are to be provided, as well as a solid wire rope running along the middle of the roof.——New waterworks are to be constructed in the town of Östersund at a cost of about 25,000*l.*——A Royal Commission has recommended the painting of three huge wall frescoes in the National Museum, one by Baron G. Cederström and two by Herr C. Larsson, but the subjects have not yet been decided.——Of late there has been considerable agitation in the Swedish press against the paving of the streets of Stockholm with granite, making that city "the noisiest in Europe." Wood-paving is recommended (London being cited as an example) for its noiselessness, durability, and cleanliness.* Wood, too, would, of course, be very cheap in Sweden.——The laying down of asphalte on the Vasa Bridge has been a complete failure, the company having the work in hand having adopted a new method as regards the foundation, which has proved worthless. The whole work has to be done over again.

* This last seems an extraordinary recommendation. The one serious objection to wood-pavement in cities is its insanitary and dirt-holding character.

MISCELLANEOUS.

SIM'S IMPROVED CASEMENT WINDOW.—This is a form of casement invented by Mr. Sim, architect, of Montrose, which contains an improvement of some importance. Mr. Sim's casement is hung to open inwards, but the bottom rail of the window, when closed, descends below the rebate of the sill in the same way as a lifting-sash window. To open the window it is raised by a handle fixed on the bottom rail, the hinges being specially constructed to allow of lifting, and the sash can then be swung inwards, the weight being taken by a gun-metal plate beneath the bottom corner of the sash, which is also shod with gun-metal. The fastening of the window is also new, effective, and simple; it consists of a gun-metal wedge fixed on the upper part of the vertical rail, which slips behind a spring fixed vertically on the window frame, the wedge driving the spring out a little and being thus securely held between it and the frame. The action of dropping the sash into its place when closed automatically fastens it by this spring arrangement. We have examined only a model on a small scale, and of course the method is open to the objection that the lifting would be inconvenient in the case of a heavy sash of large size; but the objection is not important in regard to house windows of average size.

A WORKMEN'S SANITARY CONGRESS.—The French labour party have determined that their Ninth Annual and National Congress shall be devoted to the discussion of one single subject. It was, of course, somewhat embarrassing to decide which question should thus be considered, to the exclusion of all others; but it was ultimately resolved to give the preference to hygiene in its relations to the working classes. The debates of the Congress will be divided into three different phases of this great subject. First will be taken the problem of food-supply, especially in reference to the laws of March 27, 1851, and May 5, 1855. The workers will demand that the quality of the bread they eat shall be as carefully guaranteed by the State as the quality of the gold of which the current coinage is made. The second question relates to the sanitation of the worker's home, when the futility of the Commission on Unwholesome Dwellings will be dwelt on. The last subject is the sanitation of the workshop and factory, when the decree of 1810 will be denounced in no measured terms. According to this law the public are protected against dangerous industries, but not the workers. Thus, lead works are put in the second category, because they do not give rise to injurious emanations, and are only injurious to the workmen themselves. Such will be the general scope of the Congress; but before the delegates of the trade unions and the workmen's societies who form the labour party discuss these problems they will invite the best-known scientific authorities on hygiene to deliver addresses to the Congress so as to enlighten the delegates as to the technicalities at issue. This precautionary measure is at once as wise as it is modest, and denotes considerable discretion and tact on the part of the workmen. They will find a scientific basis for their demands and make their wants known to men of science.—*Lancet.*

AUTOMATIC "IN-AND-OUT" TURNSTILE.—Mr. G. Williamson, of Hunslet, Leeds, sends us particulars of a four-armed turnstile so contrived that one arm acts as a coin-freed ingress and the other arm as an outlet, thus requiring only one turnstile instead of two. The ingress arm is locked till the insertion of a coin in a slot, when it opens sufficiently to allow one person to pass, and automatically adjusts itself to the locked position again. According to the description, the other arm can be pushed for an outlet without the necessity to unlock the ingress arm, and sets itself automatically again to the locked position. We do not see from the description what is to prevent one person inside from opening the turnstile for another outside without the ceremony of putting in the coin, but we have not seen the machine at work; this may be provided for.

GLASGOW BUILDINGS REGULATION BILL.—A sort of small civil war has sprung up in Glasgow over the Town Council's Buildings Regulation Bill. Drastic in its proposals, that measure has seriously alarmed a great number of persons interested in the property of the city, and various public bodies have actively taken part in the fray. The Measurers and the master plumbers, for instance, are for the Council, while arrayed against it are the Landlords' Association, the Institute of Architects, and the Procurators' Committee. So strong, in fact, has been the opposition that the Buildings Regulation Committee have had to yield on a number of points, such as the re-erection of burned buildings, hollow squares, the making of by-laws, the height of buildings, compensation for property taken down, and so on. It is to be hoped that in making the needful concessions to those whose pockets will be affected, care will be taken not to obliterate the good features of the Bill. A measure that will check the jerry-builder and secure proper sanitation should have the support of every loyal and sensible citizen.—*Scottish Leader.*

LONDON AND COUNTY BANKING COMPANY.—The directors of this Company, in submitting the balance-sheet for the half-year ending December 31 last, report that the net profits of the half-year amounted to 217,239*l.* 10*s.* 7*d.* They recommend a dividend at the rate of 11 per cent. for the half-year, making a total dividend of 22 per cent. for the year. The balance-sheet, which will be found in our advertising columns, was adopted at the annual general meeting of the Bank, held on the 4th inst.

SAFETY OF RAILWAY BRIDGES IN AMERICA.—According to the *Engineering Record* of New York (January 23, 1892), the subject of railway bridge

legislation, although somewhat in advance of that relating to highway bridges, is, nevertheless, in a backward condition in the United States, as compared with other nations. The Railroad Commissions of the several States, when there are any, exercise more or less supervision over the railway bridges. Massachusetts has had such a Commission since 1869, and until 1883, one of the members was a civil engineer, although there have been none since then. In New York a Board of Railroad Commissioners was established in 1883, and within a year three important bridge failures occurred. During the investigation of these failures it became apparent that there was a pressing need of more efficient supervision of bridge construction and maintenance. Accordingly the Commission sent out circulars in January, 1884, requesting every railway company to forward strain sheets of each bridge on its lines. These were carefully analysed by Charles F. Stowell, M.Am.Soc.C.E., and the data thus collected was published last June in a volume of nearly 2,000 octavo pages. The publicity thus drawn to defective structures has had a good effect on the management of all the roads, many being in actual ignorance of weak places on some of their bridges, which were immediately repaired when discovered. Other States exercise more or less defective supervision of the bridges within their boundaries, but nothing so rigid as in the two States above mentioned.

MEETINGS.

MONDAY, FEBRUARY 15.

Royal Academy of Arts.—Dr. A. S. Murray on "Archaic Compared with Archaistic Sculpture." I. 8 p.m.

Surveyors' Institution.—Paper by Mr. J. W. Grover, C.E., entitled "An Explanation of the London Water Question." 8 p.m.

Clerks of Works' Association of Great Britain.—Ninth Annual Dinner, Mr. Aston Webb, F.R.I.B.A., in the chair. Holborn Restaurant. 6.30 p.m.

Society of Arts (Cantor Lectures).—Professor George Forbes on "Developments of Electrical Distribution." IV. 8 p.m.

Victoria Institute.—8 p.m.

Leeds and Yorkshire Architectural Society.—Exhibition of Sketches by Mr. H. V. Lanchester and others. 7.30 p.m.

TUESDAY, FEBRUARY 16.

Institution of Civil Engineers.—Resumed Discussion on Mr. A. H. Curtis's paper on "Gold-Quartz Reduction Machinery." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. P. Gordon Smith, F.R.I.B.A., on "Sanitary Building Construction." 8 p.m.

Society of Arts (Foreign and Colonial Section).—Mr. Lewis Atkinson on "The Forthcoming Exhibition at Kimberley, South Africa." 8 p.m.

Glasgow Architectural Association.—Annual Supper, Exhibition of Studentship Drawings, Sketches, &c. 8 p.m.

WEDNESDAY, FEBRUARY 17.

Carpenters' Hall, London Wall.—Professor Banister Fletcher on "Sanitary Building Construction." 8 p.m. (*Admission free.*)

British Museum.—Miss Eugénie Sellers on "Greek Sculpture: The Parthenon Frieze." II. 2.30 p.m.

British Archæological Association.—Dr. Alfred Fryer on "The Church of Perranzabuloe." 8 p.m.

Civil and Mechanical Engineers' Society. — Mr. R. Booth on "Gas Producers." 7 p.m.

St. Paul's Ecclesiological Society.—Mr. T. A. Martin on "Some Religious Subjects on Misericordes." 7.30 p.m.

Royal Meteorological Society.—Four papers to be read. 7 p.m.

THURSDAY, FEBRUARY 18.

Royal Academy of Arts.—Dr. A. S. Murray on "Archaic compared with Archaistic Sculpture." II. 8 p.m.

Institution of Civil Engineers.—Students' visit to the works of the Chelsea and Lambeth Water Companies, at Molesey, and subsequently to those of the Grand Junction, Southwark and Vauxhall, and West Middlesex Water Companies at Hampton. Train leaves Waterloo (South station) at 12 noon.

British Museum.—Miss Millington-Lathbury on "The Chief Greek Festivals and Agonistic Gatherings," as illustrated by the monuments in the Museum. 2.45 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, FEBRUARY 19.

Architectural Association. — Mr. Max. Clarke on "Domestic Electric Lighting." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor W. H. Corfield, M.A., on "Sanitary Appliances." 8 p.m.

Royal Institution.—Professor P. F. Frankland on "Micro-Organisms in their Relation to Chemical Change." 9 p.m.

SATURDAY, FEBRUARY 20.

Architectural Association.—Visit to the Imperial Institute, South Kensington, by permission of the architect, Mr. T. E. Collcutt. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

2,591.—METAL SCREWS: *J. T. Steen.*—This invention relates to nails, hooks, fasteners, and the like that may be threaded for screwing, and to screws of all kinds; and the special novelty claimed is the making of metal screws oval instead of round, or with flat or nearly flat sides slightly oblong, and with threads for screwing cut only on the surfaces of longer radii, so that the screw when driven home, or part of the way home, may be firmly held on being turned a quarter round by the threads embedding themselves in the sides of the hole that have the shorter radii.

2,700.—WASTE-PREVENTING CISTERNS: *W. D. Scott-Moncrieff.*—This invention claims an improvement in the mechanism of waste-preventing cisterns, enabling them to be more simply made, and at a reduced cost. An ordinary drop-valve, provided with a suitable washer fitting upon a proper seating, is used, the raising of which starts a syphon; but instead of an ordinary spindle fixed to the pull-up attachment, the spindle is carried up and terminated with a disc or piston, and over this is slipped a loosely-fitting cylinder open at the bottom, but with a cover on the top which is attached to the pull-up mechanism. The cylinder cover is provided with a very small air-hole. When the pull apparatus is released the loose cylinder drops down by its own gravity until it rests upon the disc on the valve-spindle, but when the cylinder is raised by the pull-lever a partial vacuum is formed between the disc and the upper part of the cylinder sufficient to lift the valve and start the syphon which empties the cistern; but as the level of the water falls the vacuum between the disc and the top of the loose cylinder is destroyed, and the pull-up mechanism only moves the loose cylinder up and down without moving the drop-valve, which must remain closed until the cistern is refilled, when a pull-up of the loose cylinder will again lift the drop-valve by means of the partial vacuum.

3,457.—FLOORING CRAMP: *W. & E. Bracewell.*—The inventors claim a screw flooring-cramp with several details of novelty in the mechanism.

3,637.—DRAIN VENTILATION: *T. Brown.*—This invention relates to improved apparatus for ventilating drain-pipes, and is principally applicable to dwelling-houses. It consists in surmounting the top of the ventilating-pipe with a square box or chamber open on the side exposed to the atmosphere. To the upper and inner edge of this opening is hinged a door or "flap-valve" of mica or other light and durable substance, which will readily yield to permit the air to enter the pipe, and, closing by its own weight, prevents any return draught. Around the exposed sides of the above chamber is fixed a series of deflecting plates on the louvre principle consisting of short truncated cones fixed one within the other and leaving air-passages so that currents striking the plates laterally or upwards or downwards are deflected towards the face of the chamber, and thus is secured a constant admission of air.

20,535. — DOORS AND SWINGING SHUTTERS: *H. H. Leigh.*—This invention relates to improvements in the mechanism for closing doors and swinging-shutters of either single or double leaves, and has for its object to render them absolutely safe from being burglariously entered. The leaf or leaves are when closed made practically one with the frame and inseparable from it, excepting in the special way described.

NEW APPLICATIONS FOR PATENTS.

January 25.—1,415, F. Edwards, Concrete and Iron Beams, or Beams composed of similar materials.—1,424, F. Garou, Screwless Knob for Fastening Knobs to Spindles of Door-handles.—1,434, S. Bastow, Sliding Windows.—1,449, G. Mumford, Drain-traps.

January 26.—1,514, W. Thompson, Grinding Tools.—1,551, C. Blunck, Pavement or Covering for Roads, Pathways, Floors, Steps, &c.—1,560, H. Lake, Woodworking Machinery.—1,577, J. Ottaway, Window-sashes.

January 27.—1,603, J. Merry, Syphon Flushing Apparatus for Water-closets and Other Cisterns.—1,621, W. Gwinnett, Machinery for making Wood Screws.—1,624, J. Linley & J. Bennett, Preventing Shop Windows from being Steamed.—1,628, S. Gratrix and Others, Gaschandeliers.—1,650, P. Fowler, Fire-places.

January 28.—1,663, A. Morris, Blow-pipes.—1,687, H. Brooke, Fittings for Shop-windows, &c.—1,693, E. Harvey, Water-closets.—1,707, J. Snelling, Trap to Prevent Stoppage of Drains, made in Portland Cement.—1,708, C. Francione and J. Baconnet, Sanitation of Buildings.—1,736, W. Beddows, Triple-pitched Cutter Side Plane.—1,742, J. Hudson, Low-water Alarms for Kitchen or Domestic Boilers.

January 29.—1,760, W. Bracewell and R. Holden, Handrail for Steps and Ladders.

January 30.—1,821, R. Ardagh, Wooden Paving or Flooring Blocks.—1,827, W. Brown, Jointing Concrete Paving.—1,839, G. Paley, Water-closet Cisterns.—1,845, W. and A. Anty, Sink-traps.—1,857, O. Hawkes, Joints for Fanlights, Ventilators, &c.—1,861, A. Campion, Hydraulic Cement and Concrete.—1,869, W. Francis, Surveying Instruments.

PROVISIONAL SPECIFICATIONS ACCEPTED.

22,000, P. Beer, Chimney-pots.—22,288, D. Macrae, Locking Nuts on Bolts.—22,629, G. Hughes, Sash-fasteners.—6, W. Smeaton, Water-closets, with traps and pedestal enclosures.—26, C. Stevenson, Tilting Lavatory Basin and similar utensils.—49, C. Kingzett, Scenting, Deodorising, and Disinfecting Rooms, &c.—51, E. Ward, Flush Cisterns.—587, R. Thwaites, Preventing Water and Gas-pipes from Freezing.—589, J. Phillips, Preventing Pipes Bursting during Frost.—698, A. Boult, Glue.—727, J. Rainey, Tool-holding Attachment for Grindstones.—828, O. Hutchinson, Bakers' Ovens.

COMPLETE SPECIFICATIONS ACCEPTED.

(*Open to Opposition for Two Months.*)

3,550, W. Barns and J. Cockburn, Wheelbarrows.—5,424, J. Pulham, Fireproof Staircases, Floors, and the like.—15,873, J. M'Creery, Heating and Ventilation for Buildings, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEBRUARY 2.—By *Joshua Baker & Son*: 1B, Canterbury-ter., Maida-vale, u.t. 48 yrs., g.r. 2*l.*, r. 100*l.*, 1,110*l.*—By *Rutley, Son, & Vine*: No. 67, Regent's-pk.-rd., f., 730*l.*; "Launcelot Cottage," West-end, Hampstead, c., r. 24*l.*, 300*l.*

FEBRUARY 3.—*Charles & Tubbs*: The residence, "Elm Lawn," Woodberry-down, u.t. 72 yrs, g.r. 26*l.*, 1,600*l.*; 9, Beech-st., Barbican, f., r. 69*l.* 10s., 1,220*l.*; 10, Beech-st., f., r. 60*l.*, 1,160.

FEBRUARY 4.—By *T. B. Westacott*: 130, Sandwich-st., Burton-crescent, u.t. 15 yrs., g.r. 8*l.* 8s., r. 40*l.*, 140*l.*; 32, Sandwich-st., u.t. 15 yrs., g.r., 8*l.* 8s., r. 40*l.*, 140*l.*; 173, Gray's Inn-rd., u.t. 18 yrs., no g.r., r. 23*l.* 6s., 170*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G. ton	9/0/8	0/0/0
Teak, E.I... load	9/10/0	15/0/0
Sequoia, U.S.ft.cu.	2/3	3/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/5/0	4/10/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c.	2/0/0	3/16/0
Oak, do.	3/0/0	5/0/0
Canada.....	5/0/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntsic, fath	5/5/0	6/10/0
St. Petersburg	5/10/0	7/10/0
Deals, Finland, 2nd & 1st std	10/0/0	10/10/0
Do. 4th & 3rd..	7/10/0	8/10/0
Do. Riga	6/10/0	8/0/0
St. Petersburg, 1st yellow ..	11/0/0	15/0/0
Do. 2nd yellow	8/10/0	10/10/0
Do. white	7/10/0	10/10/0
Swedish	7/15/0	16/0/0
White Sea	8/10/0	18/0/0
Canada, Pine 1st	20/0/0	26/0/0
Do. do. 2nd....	14/10/0	16/10/0
Do. do. 3rd, &c.	8 5/0	10/10/0
Do. Spruce. 1st	8/10/0	11/0/0
Do. do. 3rd & 2nd.....	6/15/0	8/0/0
New Brunswick	7/0/0	7/10/0
Battens, all kinds	3/10/0	15/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/8/6	0/14/6
Do. 2nd.....	0/7/6	0/11/6
Other qualities	0/5/0	0/8/0
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/2½	/4
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4½	2'0
Mexican do. do	/4	/5
Tobasco do. do	/5½	/7
Honduras do..	/5½	/6½
Box, Turkey ton	4/0/0	15/0/0
Rose, Rio.....	10/0/0	20/0/0
Bahia	9/0.0	18/0/0
Satin, St. Domingo ..ft.	0/0.8	0/1/3

TIMBER (*continued*).		
Satin, Porto Rico	0/0/8	0/1/6
Walnut, Italian..	0/0/3½	0'0/7
METALS.		
IRON—Pig, in Scotland .....ton	2/3'0	2/3/1½
Bar, Welsh, in London.....	6/0.0	6/10/0
Do. do. at works in Wales	5/10.0	6/0.0
Do. Staffordshire, in London	6/5 0	6/15/0
COPPER—British, cake and ingot	47/0.0	48/0/0
Best selected ..	49/0/0	49/10/0
Sheets, strong..	57/0.0	58/0/0
Chili, bars	43/13 9	44/1/3
YELLOW METAL lb.	0'0/5½	0/0/5¾
LEAD—Pig, Spanish ....ton	10/10/0	10/12 6
English, com. brands	10/13/9	11/5/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	12 10'0	0'0/0
Pipe	13/0.0	0/0/0
ZINC—English sheet .....ton	25/10.0	0/0/0
Vieille Montagne.....	26/0.0	0/0/0
TIN—Straits	89/7/6	89/10/0
Australian	89/10/0	89/12/6
English Ingots	93/0/0	93/15/0
OILS.		
Linseed .....ton	18/17/6	19/2/6
Cocoanut, Cochin	26/0/0	0/0/0
Do. Ceylon	23/0/0	0/0/0
Palm, Lagos	23/0.0	0/0/0
Rapeseed, English pale	26/10.0	0/0/0
Do. brown	25/0/0	0/0/0
Cottonseed ref...	17/15/0	0/0/0
Oleine	0/0/0	0/0/0
Lubricating, U.S.	4/10/0	5/10/0
Do. refined	5'0.0	10/0/0
TAR—Stockholm barrel	0/19/0	1/0/0
Archangel	0/12/6	0'0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BRIGHTON.—For repairs, &c., to No. 68, Lansdowne-place, Hove, Brighton, for the Misses Harbord. Mr. Walter J. Ebbetts, F.R.I.B.A., architect, Savoy House, 115, Strand, W.C.:—

H. Baylis £160	W. & A. Elliott £140

BURGESS-HILL (Sussex).—For new manse in connexion with Congregational Church, Burgess-hill, Sussex. Mr. E. J. Hamilton, architect, Brighton. No quantities:—

Wm Downer	£921	Wm. Briant*	£735
Simeon Norman.....	862	[All of Burgess-hill.]	
Oram	757	* Accepted subject to reductions.	

CHICHESTER.—For new Congregational Church Schools, &c., Chichester, Sussex. Mr. E. J. Hamilton, architect, Brighton. Quantities by the architect:—

Stephens, Bastow, & Co. ..	£3,400	Thos. P. Hall	£2,658 0
Holloway Bros.	3,138	Joseph Potter.....	2,545 0
W. H. C. Curtis	3,107	J. C. Budden, Chichester*	2,535 0
Arthur Burrell	3,100	P. Peters	2,460 9
Walter Wallis.....	2,794	Stallard.....	2,450 0
W. R. Sight & Co.	2,757	Alfred Jones	2,350 9
J. O. Holt.....	2,730	Fred. Stevens.....	2,329 0
Snewin Bros.	2,687	W. Winslade	2,120 15
John Croad	2,670		

* Accepted subject to reduction for omissions.

LEEK.—For erecting two houses at Wall Grange, Leek, for Mr. W. Challinor. Messrs. W. Sugden & Son, architects, Leek:—

W. Knowles & Joseph Stubbs (accepted)..... £415 13 0

LEYTON.—For constructing teachers' rooms, and other alterations to the Harrow-green Schools, for the Leyton School Board. Messrs. J. T. Newman & Jacques, Architects to the Board, 2, Fencourt, E.C.:—

Wood	£423	Grigar	£368
Reed	413	Coxhead	349
Scott	397	Holland*	344
Catley.....	380	* Accepted.	

LINCOLN.—For the formation and completion of a new road along the west side of the Lincoln County Hospital, from Greetwell-road to Hill-top-road, including sewering and channelling. Mr. Wm. Watkins, surveyor:—

Wright & Sons.....	£655 0 0	Howson (accepted)....	£584 17 6
Otter & Co.	631 5 9	Bradley	574 1 9

LLANTRISSANT.—For alterations, additions, &c., of Williamstown Schools, Penygraig, for the School Board. Mr. J. J. Evans, C.E., architect, Penarth:—

T. Morgan	£597 0	B. Cole & Son, Williams-town*	£433 12
Lemuel Evans	595 0	* Accepted.	
Chedzy & Thomas	580 0		

[Architect's estimate, £578].

LONDON.—For alterations and additions to "Foley House," Hampstead Heath, for Mr. Edward Gotto. J.P. Mr. E. Burgess, architect. Quantities by Mr. W. Thornicraft:—

Dove Brothers	£2,735	Scrivener & Co.	£2,422
Lawrence & Sons.....	2,488	Pearce & Ellis	2,381

LONDON.—For the erection of a warehouse in rear of No. 6, Upper Thames-street, E.C., for Messrs. Hilton, Anderson, & Co. Messrs. Hudson & Booth, architects. Quantities by Mr. Henry Lovegrove:—

Thomas Rider & Son.....	£1,698	W. Scrivener & Co.	£1,619
E. Lawrence & Son.....	1,647	B. E. Nightingale	1,525
Hall, Beddall, & Co.	1,620	John Greenwood.....	1,498

LONDON.—For additions and alterations to the Orphan Working School, Haverstock-hill, N.W. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Bryan & Sons (accepted) £3,508 0 0

[For full list see *Builder* for Jan. 30, p. 89.]

LONDON.—For the construction of a new class-room for babies, and other works, at the Denmark-street schools, Plaistow, for the West Ham School Board. Messrs J. T. Newman & Jacques, Architects to the Board, 2, Fen-court, E.C.:—

Vigor	£617 0	Goodchild	£549 0
Morter	605 0	Sharpe	530 0
Maddison	595 0	Catley	529 0
Read & Son.....	593 0	Hosking	527 0
Hearle & Farrow	589 0	Norton & Son	489 0
Good.....	589 10	Allen & Cleminson*	460 0

* Accepted.

LONDON.—For the erection of a furniture store adjoining the Stock-street Schools, Plaistow, E., for the West Ham School Board. Messrs. J. T. Newman & Jacques, Architects to the Board, 2, Fen-court. Quantitities by Messrs. R. L. Curtis & Son:—

Vigor	£3,138	Catley	£2,470
Good	2,995	Morter	2,455
Hearle & Farrow.....	2,579	Goodchild	2,447
Allen & Cleminson.....	2,530	Maddison	2,387
Norton & Son	2,515	Sharpe.....	2,360
Hosking	2,485	Read & Son (accepted)	2,278

LONDON.—For alterations and additions to the Hallsville Schools, Canning Town, for the West Ham School Board. Messrs. J. T. Newman & Jacques, Architects to the Board, 2, Fen-court, E.C. :—

Maddison	£3,381	Sharpe*	£2,060
Hearle & Farrow	2,246		

* Accepted.

LONDON.—For alterations and repairs to No. 152, Fleet-street, E.C., for Mr. S. Alderton. Mr. Walter J. Ebbetts, F.R.I.B.A., architect, Savoy House, 115, Strand, W.C. :—

		Extra.
Drew & Cadman	£930	£98
C. Spreckley	924	52
W. Smith	798	47

LONDON.—For repairs, &c., to No. 1, Rosslyn-gardens, Belsize-lane, Hampstead, for Messrs. Clarke & Calkin. Mr. Walter J. Ebbetts, F.R.I.B.A., architect, Savoy House, 115, Strand, W.C. :—

R. A. Yerbury	£270	H. Baylis	£185
Manktelow & Co.	227	W. Steel	168

LONDON.—For providing and fixing heating apparatus on the low pressure hot-water system for the new school which is now in course of erection on the Lauriston-road site, Victoria-park, South Hackney, for the School Board for London. Mr. T. J. Bailey, Architect :—

W. G. Cannon	£498 15	Jones & Attwood	£430 0
R. Crane	494 0	Russell & Co.*	430 0
Purcell & Nobbs	446 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For providing and fixing heating apparatus on the low pressure hot-water system for the new school in course of erection in Sayer-street, Walworth, for the School Board for London. Mr. T. J. Bailey, Architect :—

Wenham & Waters, Lim.	£550 0	Jones & Attwood	£490 0
W. G. Cannon	528 0	J. Wontner Smith, Gray, & Co.	454 15
Russell & Co.	516 0		
Messenger & Co.	510 10	J. Fraser & Son*	443 10

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of school buildings, water-closets, play-grounds, boundary walls and gates, school-keeper's house, &c., at Gayhurst-road, in the Hackney Division for the School Board for London. Mr. T. J. Bailey, Architect. Quantities by Mr. Henry Lovegrove :—

J. Mowlem & Co.	£17,850	E. Lawrence & Sons	£16,346
T. Boyce	17,750	C. Cox	16,266
G. S. S. Williams & Son	17,094	Killby & Gayford	15,976
Hart Bros.	16,878	W. M. Dabbs*	15,697

* Recommended by the Works Committee for acceptance.

LONDON.—For building new warehouse at Stevens-street, Lissongrove, Paddington. Messrs. Wylson & Long, architects, 15, King William-street, Strand :—

Summerfield	£1,705	R. Wright	£1,590
Kearley	1,698	Williams & Richards, Clapham Junction (accepted)	1,573
Marks	1,665		

ORPINGTON (Kent).—For Poor Law Schools, Orpington, Kent. Mr. Frederick A. Walters, architect, 4, Great Queen-street, Westminster. Quantities by Mr. John B. Lofting, 4, Great Queen-street, S.W. :—

Stimpson & Co.	£14,450	H. Sanders	£13,385
Holloway Bros.	14,019	F. & H. Higgs	13,360
Patman & Fotheringham	13,975	J. Smith & Sons	13,095
Silver & Sons	13,768	J. Longley & Co.	12,925
W. Smith	13,675	T. Gregory & Co.	12,797
Bottrill & Sons	13,600		

PONTYPRIDD.—For the erection of four shops and dwelling-houses, Taff-street, for Mr. D. R. Evans. Mr. A. O. Evans, architect, Pontypridd. Quantities by architect :—

W. Thomas & Co	£3,934 0	W. Julian	£3,624 0 0
E. Turner & Sons	3,888 0	D. C. Jones & Co.	3,588 0 0
G. Griffiths	3,636 17	Howell Powell	3,570 13 9

WIMBLEDON.—For the erection of a new boiler-shed and new lavatory at the Wimbledon Steam Laundry, Cranbrook-road, Wimbledon. Mr. Walter J. Ebbett, F.R.I.B.A., architect, Savoy House, 115, Strand, W.C. :—

H. Harmer £154 14 0

TO CORRESPONDENTS.

A. G. (we cannot enter into a discussion on the point).—W. P. B.—G. B. M.—"Foghorn" (next week).—C. J. C. (see permanent answer to your question below, in regard to books).—R. J. R. (we must ask for an authoritative statement from the Committee or the Assessor).

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1891.

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3. ST. ALBAN'S	Mar. 7.	9. NORWICH	Sept. 5.
4. PETERBOROUGH	April 4.	10. ROCHESTER	Oct. 3.
5. WELLS	May 2.	11. LINCOLN	Nov. 7.
6. EXETER	June 6.	12. GLOUCESTER	Dec. 5.

1892.

13. ST. PAUL'S	Jan. 2.	16. ELY	April 2.
14. HEREFORD	Feb. 6.	17. LLANDAFF	May 7.
15. CHICHESTER	Mar. 5.	18. OXFORD	June 4.

[Further arrangements will be duly announced.]

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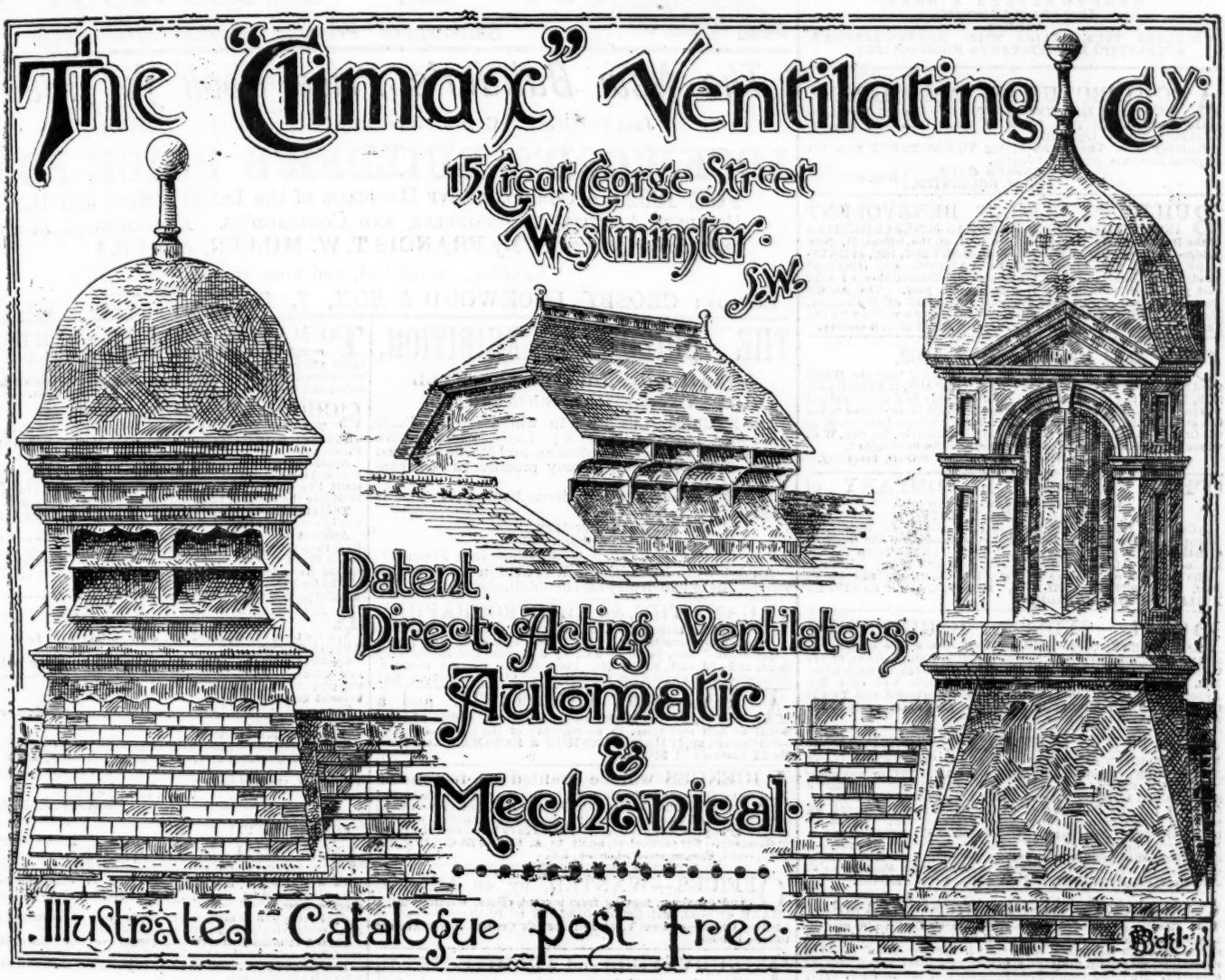

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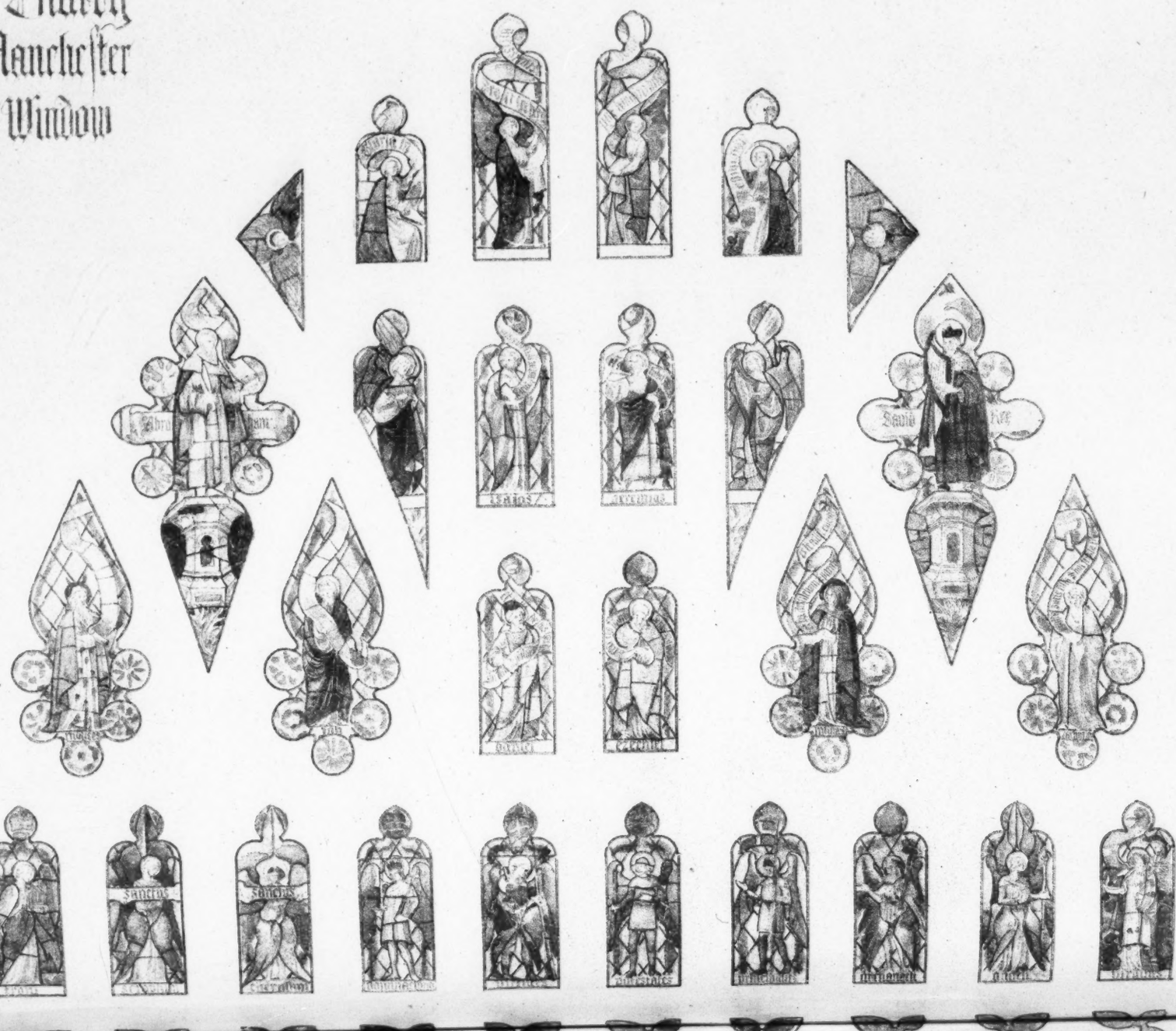

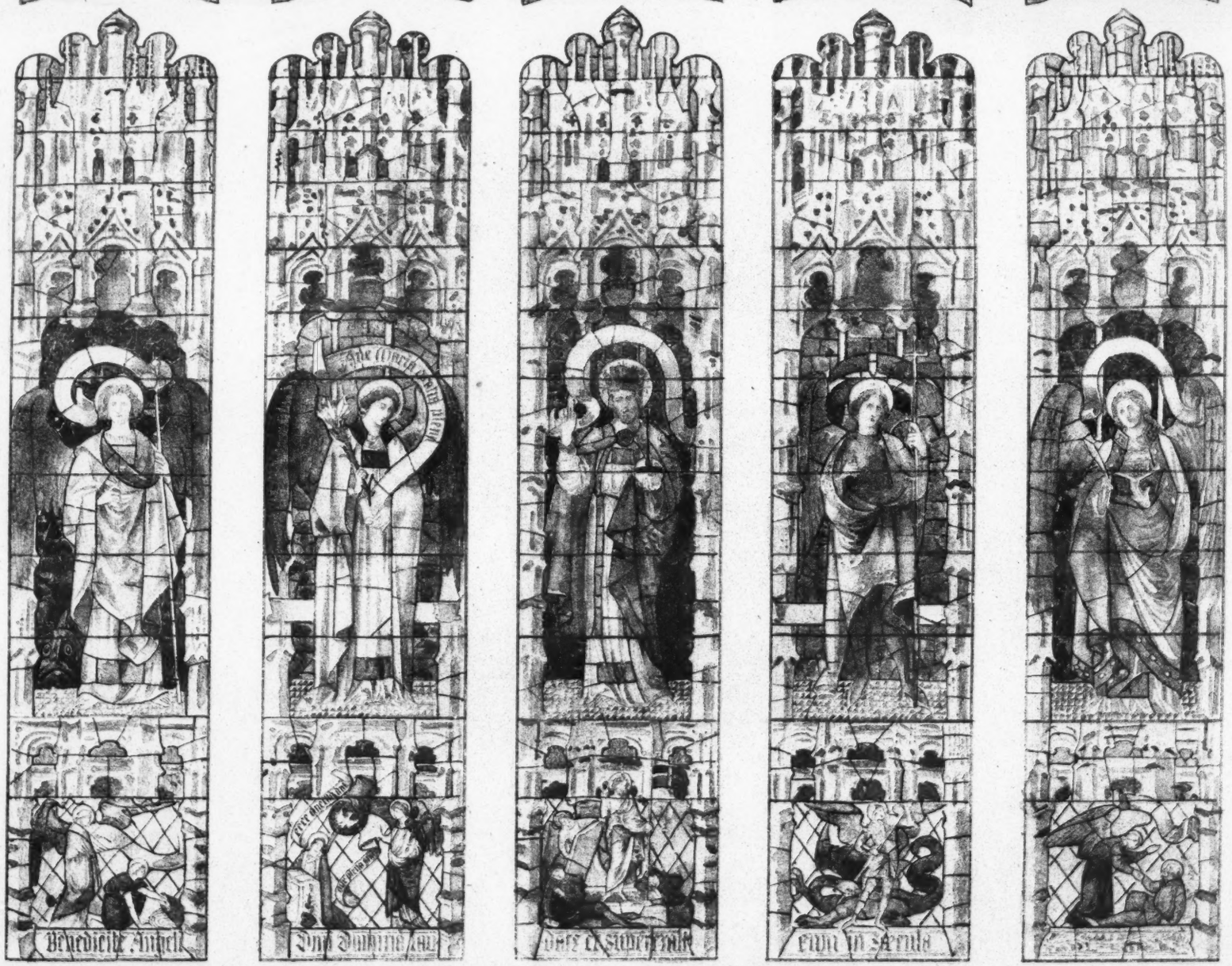

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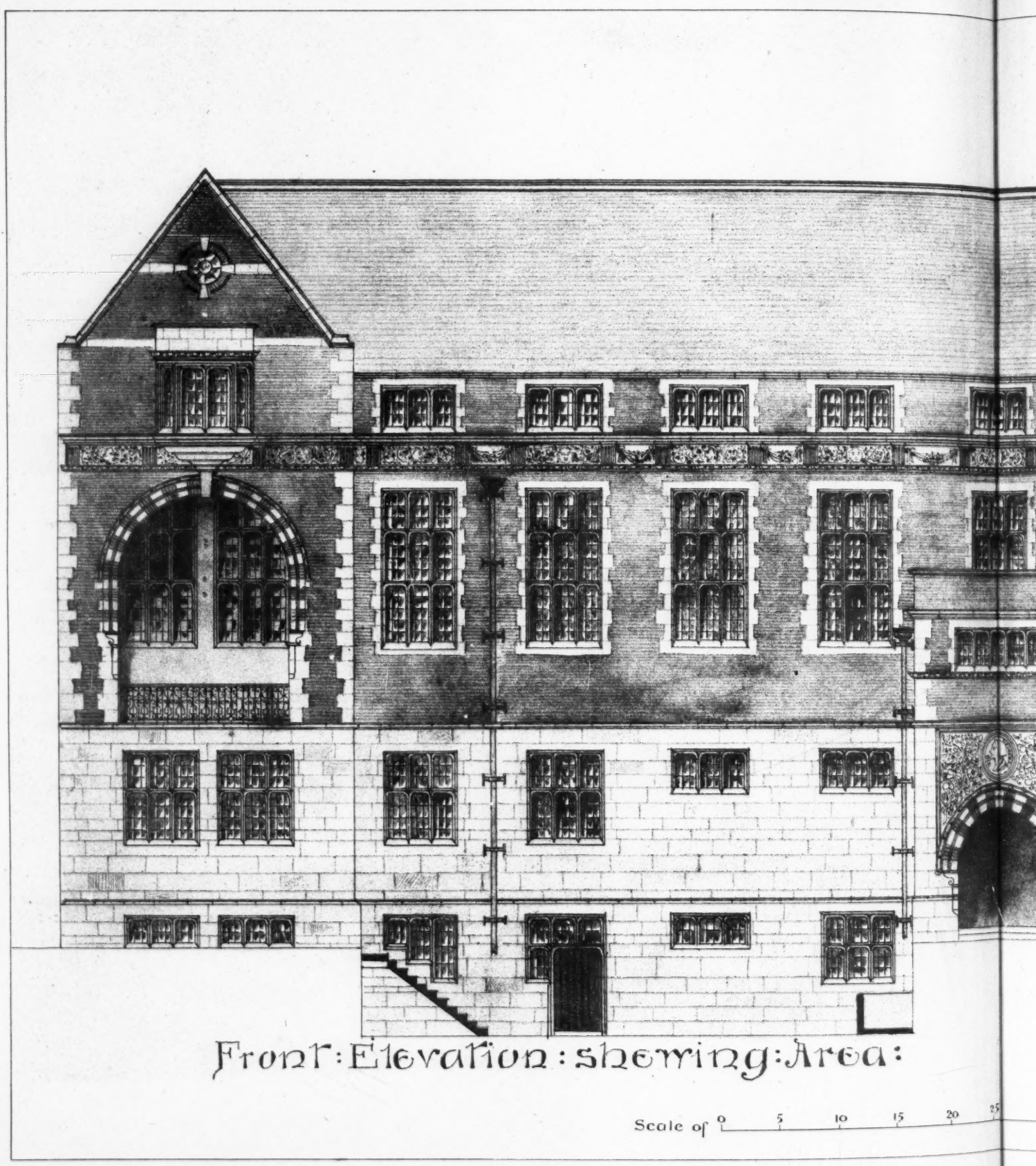

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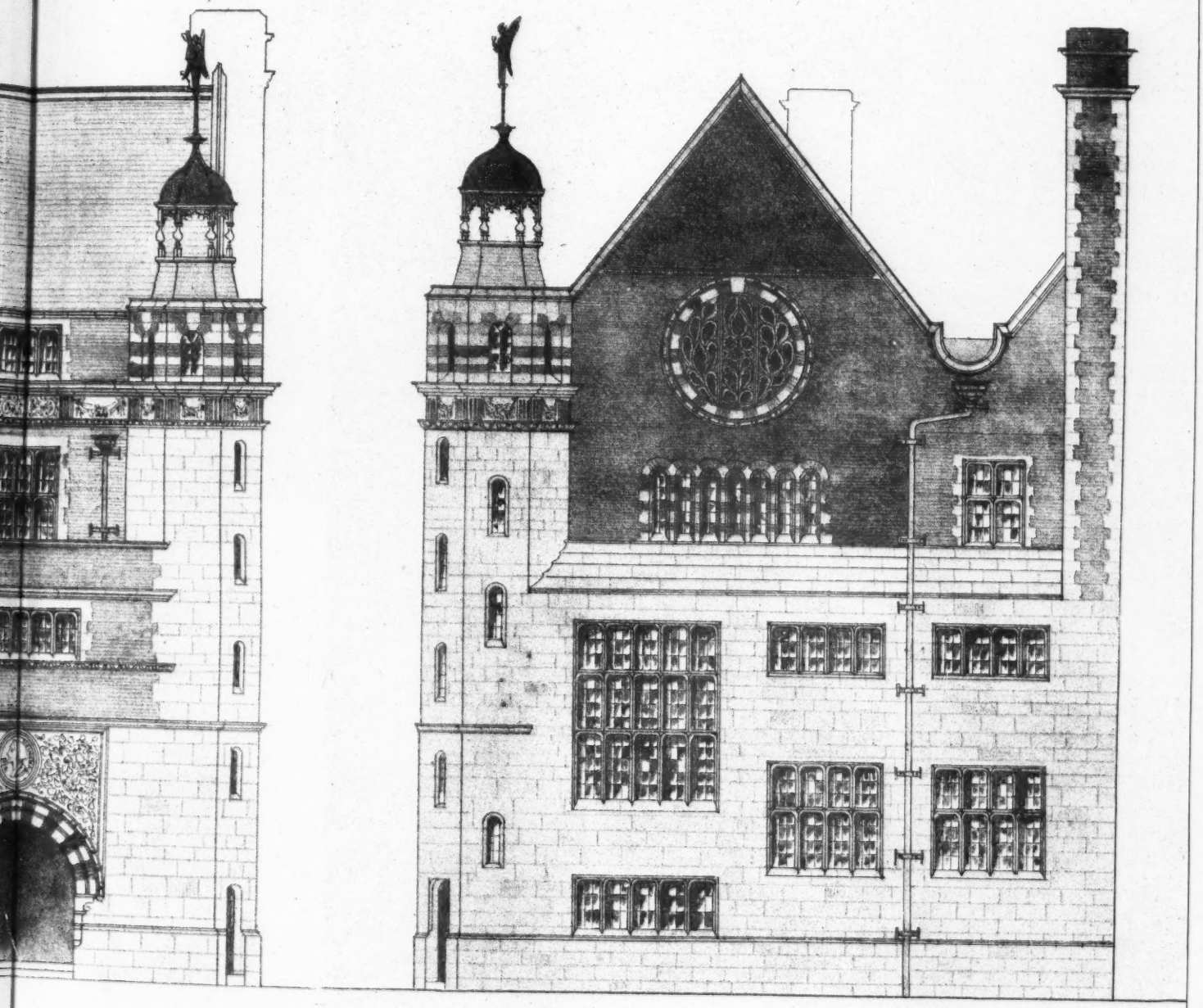

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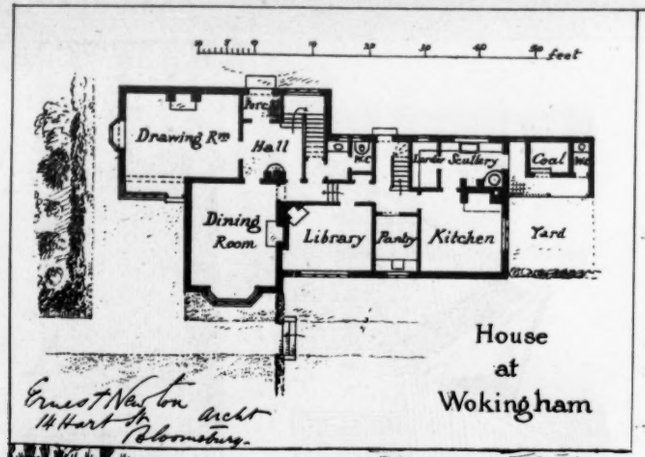

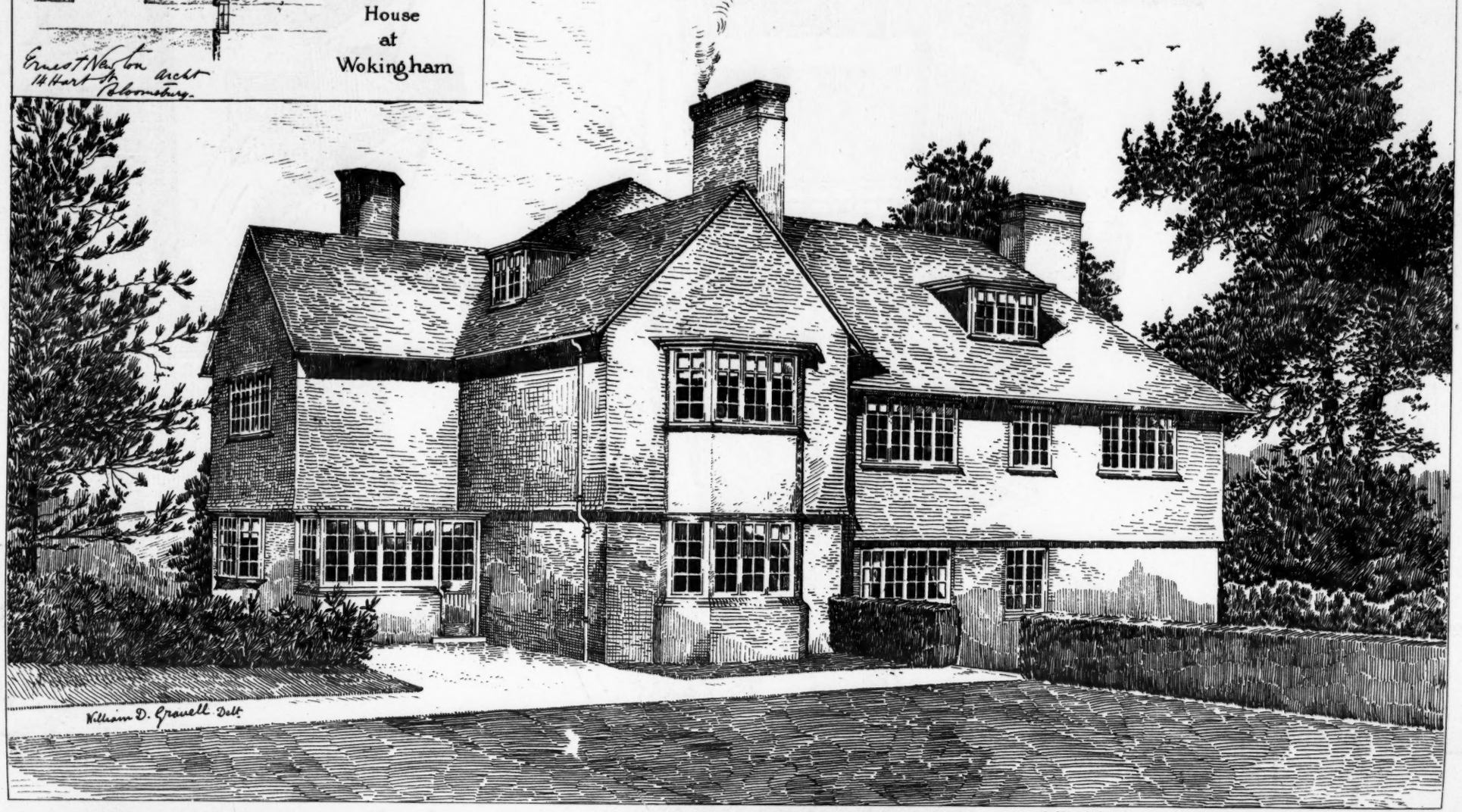

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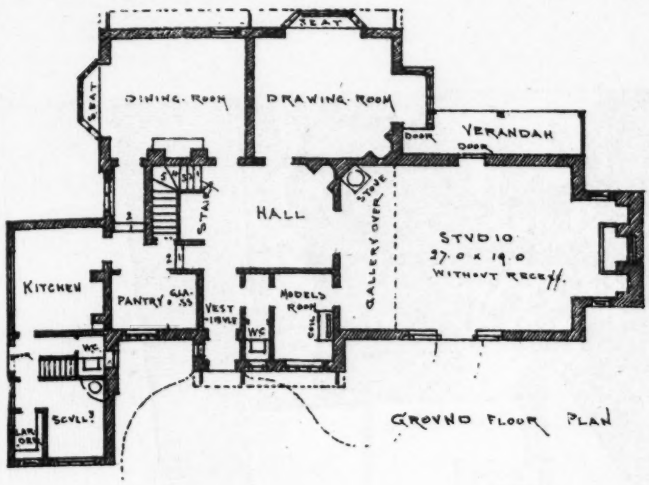

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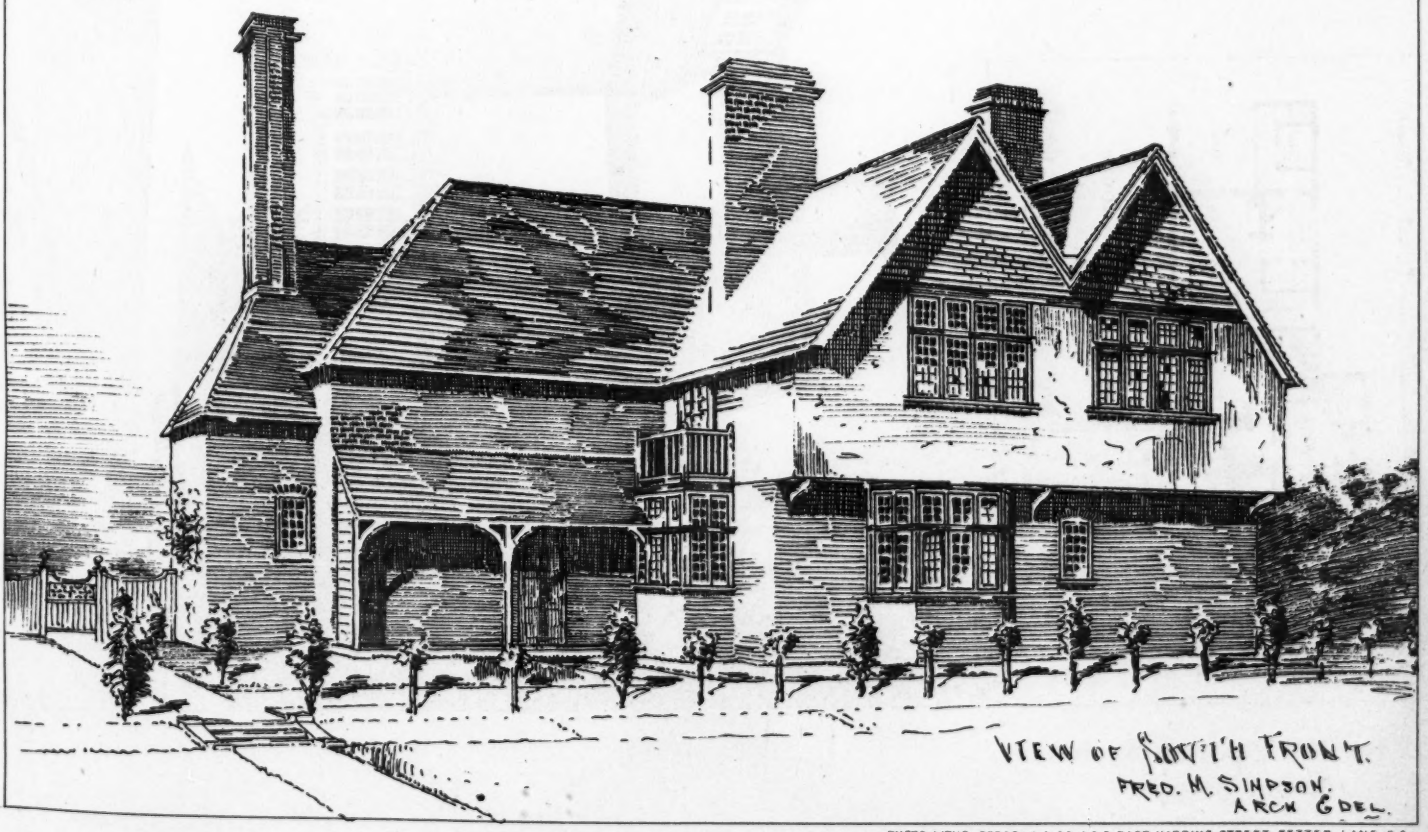

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